UNIVERSITY OF GHANA

UNDERSTANDING THE NATURE OF MARKETING ANALYTICS IN GHANA: A CASE STUDY OF MULTINATIONAL FIRMS.

BY

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THIS THESIS IS SUBMITTED TO THE UNIVERSITY OF GHANA, LEGON IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF MPHIL MARKETING DEGREE.

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DECLARATION

I do hereby declare that this long essay is the result of my own research and has not been presented by anyone for any academic award in this or any other university. All references used in the work have been fully acknowledged. I bear sole responsibility for any shortcomings.

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CERTIFICATION

I hereby certify that this thesis was supervised in accordance with procedures laid down by University of Ghana, Legon.

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DEDICATION

I dedicate this project work to the Almighty God and my beloved family who made a great investment in my life, by contributing to my education.

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In preparing this report many people have been of immense assistance. I wish to acknowledge my indebtedness to the Almighty God who strengthened me. Blessed be the LORD my strength, who trains my hands for the battle and my fingers for the war.

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ABSTRACT

Over the years, marketing analytics had surfaced as a third component of the marketing research, considered on equal footing with quantitative and qualitative research. While the process is not new, its implementation and uses today are always changing, in an environment where consumers are evolving, hence the need for marketers to gather as much relevant information on the customer as is practically and ethically possible. This study thus investigated the nature of marketing analytics in multinational organisations in Ghana. Utilising a qualitative research approach, the researcher adopted a case study strategy, semi-structured interview, and a purposive sampling technique to sample four multinational organisations in Ghana. Three research questions were investigated. With the use of a thematic analysis, key findings for the study were discovered. Objective one, which explored the purpose and usage of analytics, it was revealed that marketing analytics was used mainly for promotion by the organisations. Additionally, it was discovered that the use of analytics was still developing in most organisations. The next objective was to identify factors which influence the organisation's use of analytics. Two major finding revealed here were that the type of organisation and competition were key factors affecting the use of analytics in marketing. Finally, the study's objective three sought to investigate the success and challenges associated with the use of marketing analytics and discovered that successes included effective tracking of marketing performance and campaigns while some challenges arose from dealing with third party organisation or lack of employee knowledge with the use of various marketing analytics software/tools. The study recommends that organisations develop a culture centred around the use of marketing analytics while there must be training for employees in order to better utilise analytical software/tool

CHAPTER ONE

INTRODUCTION

1.0 Background of the Study

The desire of companies to make profit has led them to employ a blend of marketing tools and strategies to help them reach and satisfy their customers at a profit. These promotional activities, however, do not come cheap as they form a significant portion of the budget of companies. Literature demonstrates that unfortunately, marketers over the years have been unable to evaluate their marketing spend and therefore unable to convince business leaders as to exactly how their activities contribute to the bottom line (Ling-Ye, 2011; O'Sullivan & Abela, 2007; Rust et al., 2004; Stewart, 2009; Wiersema, 2013). The question of how much should be spent on marketing activities and whether these activities are necessary at all is a recurring one which could be accurately answered if organisations knew exactly how marketing activities affected customers and how it influenced the behaviour of customers towards the firm and its products. Obtaining the right kind of knowledge stems from having appropriate data and perhaps, the answer may lie within the recent buzzword “big data”.

Traditionally, data has been collected by techniques such as market surveys using questionnaires and focus groups, but the responses of the people sampled may not always reflect their true feelings about the brand or even their purchase intentions. The proliferation and use of technological devices and software by consumers all over the world has led to the generation of exponential amounts of data which has been popularly referred to as “big data”. According to www.ibm.com, 2.5 quintillion bytes is crated daily, as such, close to 90percent of available data globally has been generated over the few years. This data comes from multiple sources: sensors used to gather climate information, posts to social media sites, digital pictures and videos, purchase transaction records, and cell phone calls.

Narrowing down to our context, www.theafricareport.com report that in Ghana alone, mobile phone subscribers stood at 31,154,420 as at March 2015 and all these users generate data on a day to day basis. The unparalleled volume, velocity and variety of data generated by individuals has the potential of improving insight into consumer behavior and formulating marketing strategy (Erevelles, Fukawa & Swayne, 2015).

Obtaining data represents the first step in a series of analysis in reaching the depths of data which would serve as "actionable" data for the firm. This is known as marketing analytics. Lilien (2011) defines marketing analytics more succinctly as, "a technology-enabled and model-supported approach to harness customer and market data to enhance marketing decision making". Scholars have varied opinions on the appropriateness of marketing analytics for firms. Indeed, some schools of thought (Germann, Lilien and Rangaswamy, 2013; Peters and Waterman, 1982) assert that spending time on specifically marketing analytics and structured decision making in general can raise more questions than answers resulting in the stifling of decision making and overall creativity in the organisation. In contrast, other scholars (Natter, Mild, Wagner, & Taudes, 2008), state that it helps improve the general consistency in decision making of organisations. Marketing analytics also give companies access to broader decision options according to Sinha and Zoltners (2001). The puzzle that arises is whether and how the potential of marketing analytics proves to be relevant in informing marketing decision making specifically in the Ghanaian business environment.

1.1 Problem Statement and Research Gaps

There has been a lot of discussion and sensationalism surrounding the emergence and potential of big data and analytics over the past few years (eg. Zikopoulos and Eaton, 2011; McAfee, Brynjolfsson, Davenport, Patil and Barton, 2012; Chen, Chiang and Storey, 2012). Manyika, Chui, Brown, Bughin, Dobbs, Roxburgh, and Byers (2011) extolled big data as the next frontier for innovation, competition and productivity. The researchers recognized big data as having the potential to transform the entire phase of business positively.

Despite the apparent growing interest in this field, Murthy (2006), presents that the adoption and usage rate of analytics for marketing functions is still relatively slow with Hauser (2007), explaining that the phenomenon appears to apply to both less advanced and more advanced economies.

Additionally, Venter and Tustin (2009) who quantitatively researched marketing analytics as part of business intelligence found that even though larger businesses had more resources and more access to data, employees were largely dissatisfied with how this data was being used. They proposed a qualitative research to investigate whether other factors rather than business size, industry and decision-maker positions play a role in how organisations adopt business analytics. Järvinen and Karjaluoto (2015) examined web analytics (a subset of marketing analytics). They found that marketers' skills in using web analytics was inadequate and proposed that other marketing metric systems be evaluated.

In the academic sphere, Chen et al. (2012) conducted a search of academic journals with the keywords *business intelligence*, *business analytics* and *big data* from the year 2000 to 2011. They found that there was a total of 3146 articles on *business intelligence*, 213 on *business analytics* and 243 on *big data*. Publications on these three key words increased steadily from 2008 and increased rather sharply from 2010 to 2011, indicating an upsurge of interest in

the field. However, there still existed debates as to the benefits of analytics as used specifically in the field of marketing with suggestions being that it basically involves "excessive delays in the name of information-gathering breeds analysis paralysis," leading to opportunities being missed and generally, subpar firm performance (Germann,et al., 2012; Harari 1996; Peters and Waterman, 1982). This, probably being the cause of some hesitance in its adoption and there is therefore the need to conduct more research in this field to illuminate the benefits or otherwise of analytics.

Additionally, general literature on analytics is centered in countries Europe and North America, and India which are the technologically advanced countries (Chen et al., 2012), indicating that the area is under-researched in less technologically advanced countries, especially in Africa. With the exception of South Africa which is technologically advanced compared to most African nations, there has been little to no research done within the continent on the issue of the use of analytics in the field of marketing. There is therefore the need to investigate big data fuelled marketing analytics in an emerging economy like Ghana to provide guidance for its use in Ghana and similar countries.

1.2 Research Purpose

This study seeks to explore the nature of marketing analytics in multi-national firms in Ghana, the implementation strategies and metrics these companies are deploying in their marketing activities, as well as successes and challenges that have stemmed from the use of marketing analytics.

1.3 Research Objectives

1. To explore the purpose and usage of marketing analytics in multi-national firms in Ghana.

2. To investigate the factors that influence multi-national use of marketing analytics.

3. To explore the successes and challenges of using marketing analytics in multi-national firms.

1.4 Research Questions

1. What is the purpose and how do multi-national firm in Ghana use firms?
2. What factors influence multi-national firms in Ghana to use marketing analytics?
3. What are some of the successes and challenges of utilising of using marketing analytics Ghana?

1.5 Significance of the Research

This study will have significance for research and practice.

With regards to research, this study will examine a broader view of the use of marketing analytics as opposed to other studies that focus on one aspect such as social media analytics and web analytics. Marketing analytics has been scarcely researched in a developing country context and within Sub-Saharan Africa. Therefore, this research will pioneer literature in this area.

In practice, this study will first aid the case companies to conduct a reflective analysis on what they are doing right or wrong in their use of marketing analytics. The study will also provide a guideline for Ghanaian companies who are inclined to adopt marketing analytics in their firms. They will be able to know the structures to put in place to ensure a successful implementation, the challenges they may face as well as the benefits they will reap as a result using analytics in decision making.

1.6 Chapter Disposition

The research paper is disposed into 6 chapters. The first chapter comprises a detailed exposition of the introduction to the research, research gaps, research problem, research objectives, and research questions, and significance of the study. An exhaustive review of relevant literature on big data, big data analytics, marketing analytics, history of marketing analytics and benefits to the adoption of marketing analytics are presented in Chapter 2. The chapter also studies into detail a theory to anchor the study.

Chapter 3 places the study in context; specifically, service sector in Ghana and the various organisations utilised for the study and their practice in Ghana. It also presents an exposition of the private sector and large-scale enterprises.

Chapter 4 captures the methodological approaches adopted for the study. The Chapter underscores such key elements as the philosophical assumptions in which the study is anchored, the research paradigm and the research design strategy. Also discussed in the Chapter are the sampling technique-specifically purposeful sampling- and sample size, the data collection instrument (personal interviews), mode of analysis, and ethical considerations.

Chapter 5 presents data analysis, findings and discussion, while Chapter 6, finally, comprises a summary of the study's findings, conclusions and recommendations. Closing out the study are the study's references and appendices which include a tabular representation of findings and case histories.

CHAPTER TWO

CONTEXT OF STUDY

2.0 Introduction

This chapter presents an overview of the background of the sector and the various organisations utilised for the study. The section presents information on Ghana's service sector, Information Technology growth in Ghana, MTN Ghana, AirtelTigo, Jumia and Ringiers Africa Digital Publishing.

2.1 The Service Sector

Enu et al., 2015 posit that the service sector in more recent times appear to be the main driver of several economies, even more so with technological development and globalization, contributing greatly to the GDP in major continents such as Europe, Asia, Africa (Angus, 2003). Services presently contribute over 60% of GNP in many of the advanced economies, and the sector remains a prominent element in the performance of manufacturing and resource industries in several countries.

Additionally, the World Bank (1995), presents that the service sector contributes jobs to about 60% in the manufacturing sector in USA. The rate of growth of trade in services is also greater than other trade constituents.

In most nations, India, for instance, the service sector has appeared as the fastest growing sector. It is noted that, within the space of fifteen years, after the sector recorded a low growth, it grew at an unusually remarkable rate (Einchengreen & Poonam, 2009). The Chinese economy is no exception, with the economy growing steadily with the service sector playing an important role with a substantial increase in its contribution to GDP. The non-manufacturing activities now cover a large percentage of the economy while the

manufacturing sector covers about 45 percent, with the remaining percentage going to agriculture. Consequently, China is diversifying its economy from the heavy dominance of the industry, manufacturing and investment in infrastructure, which for decades were the driving forces of China`s economic development, to a more productive growth by raising the share of activity generated by the service sector especially in areas of logistics, tourism, engineering, healthcare and information technology (SENER, 2013).

Services account for a large and growing share of overall Sub-Saharan Africa (SSA) economic output. In 2015, the services sector accounted for 58.0 percent of SSA gross domestic product (GDP), up from 47.6 percent in 2005. However, despite rapid growth, the services share of SSA's GDP remained significantly lower than the 2014 global average (68.5 percent, latest available data). The extent to which individual SSA countries rely on the services sector output varies widely. For example, in 2015, services accounted for more than 70 percent of GDP in Cabo Verde, Mauritius, and Sao Tome and Principe. Distribution services (including restaurants and hotels) and financial, business, and real estate services are large contributors to services output in each of these countries. By contrast, services accounted for a particularly small share of output in Chad (33.4 percent) and Sierra Leone (33.9 percent) as at 2015. The agriculture sector accounted for over half of GDP in each of these countries in 2015 (52.4 percent for Chad and 61.3 percent for Sierra Leone). Services accounted for a large and growing share of overall SSA economic output. In 2015, the services sector accounted for 58.0 percent of SSA gross domestic product (GDP), up from 47.6 percent in 2005. However, despite rapid growth, the services share of SSA's GDP remained significantly lower than the 2014 global average (68.5 percent, latest available data).

2.1.1 Structure of the Ghanaian Service industry

In the past years (in the 1990`s), the service sector of Ghana contributed a little to GDP at a steady rate. At that time, the agricultural sector was known for its dominance followed by the service sector and then followed by industry. With time, the service sector has seen incredible performance, notably the remarkable growth.

Growing at an annual rate of 9.8 percent in the year 2010, to a 5.3 percent for agriculture and 7 percent for industry, contributions of the service sector rose to 51.1 percent from the 49.2 percent recorded for the previous year. With the discovery and produce of oil, growth in industry overtook the other sectors. Nevertheless, the service sector remained as the biggest GDP contribution with 49.1 percent. This renewed growth continued in 2012 when it out paced agriculture and industry by 12.1 percent to 2.3 and 11 percent respectively, accounting for a 49.1 percent growth in GDP as against 22.9% and 28% for agriculture and industry correspondingly.

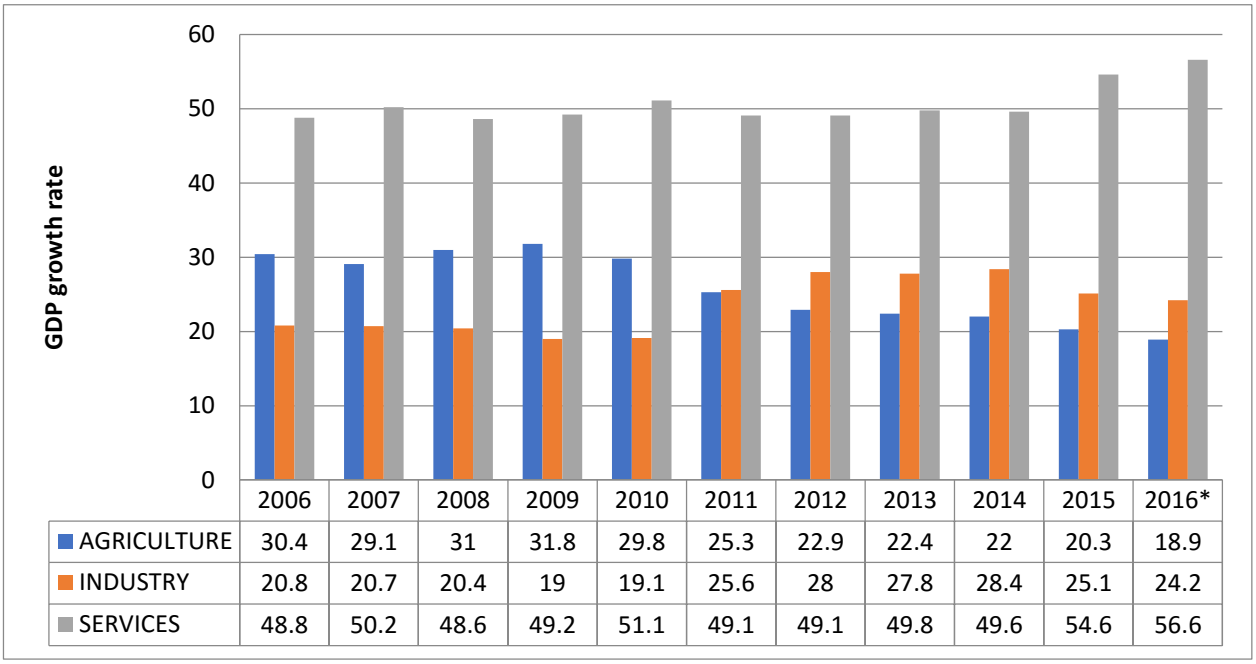
This growth has continued to remain steady at various periods of the Nation's growth, though it sometimes experiences some fluctuations and decline.

The main sub-sectors of the service sector in Ghana include: trade and repair of vehicles; households and goods; hospitality services; transport and storage; information and communication; financial intermediation; business; real estate; public administration and defense; social security; education; health; social work, community social and personal.

2.1.2 Contributions of the Service Industry to the Ghanaian Economy

Ghana's economy is to a large extent propelled by the service sector, which is made up of components such as hospitality services, transport, tourism, trade, financial and insurance services, real estate, professional, administrative, public administration; education; health; commodity, social and personal services activities. The service sector in many years,

contributes more than half of the nation's GDP, with the third quarter of 2009 existing as one of the few times where the service sector has been slightly outpaced by the agriculture sector. The service sector contributes immensely to the growth of the economy. For instance, in 2013 the sector experienced a growth rate of 10.0%. Although it experienced a decline in this rate in 2014 with 5.6%, it still remains the largest sector contributing to 49.6% of GDP in the country. The second largest sector, which is the industrial sector, however decreased slower with 0.8% in 2014 and 6.6% in 2013. In addition, the agricultural sector experienced a decline from 5.7% in 2013 to 4.6% in 2014 (Table 2.1). Hence, the growth rates of all the three sectors declined between the years of 2013 and 2014. The GSS (2016) indicated that the service sector continues to influence the country with a GDP growth rate of 56.9% in 2016, followed by the industrial sector with 24.2%, and then the agricultural sector with 28.9% GDP.



	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016*
AGRICULTURE	30.4	29.1	31	31.8	29.8	25.3	22.9	22.4	22	20.3	18.9
INDUSTRY	20.8	20.7	20.4	19	19.1	25.6	28	27.8	28.4	25.1	24.2
SERVICES	48.8	50.2	48.6	49.2	51.1	49.1	49.1	49.8	49.6	54.6	56.6

Figure 2.1: Sectoral contribution to national output, 2006-2016 (% at GDP; Basic price)

Source: SGER, 2014; GSS, 2016 (provisional)

From Figure 2.1, the sector stands as the largest sector in the economy in 2016. The growth in the service sector has improved in several areas including: health and social work (1.4%); administrative and support service activities (4.0%); hotels and restaurants (5.9%); trade; repair of vehicles social, household goods (6.4%); education (4.0%); transport and storage (13.3%); public administration and defence (5.4%); community, personal and social services activities (3.7%); and real estate, public administration and support services activities (4.0%).

This is underscored in Table 2.1 below.

Table 2.1: Sub-sectorial distribution of GDP (%)

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016*
Trade; Repair of vehicles, household goods	6.4	6.1	6.0	5.9	6.2	5.9	5.6	5.8	5.6	6.1	6.4
Hotels and restaurants	5.0	5.6	6.0	6.2	6.0	5.4	4.8	5.8	5.6	5.8	5.9
Transport and storage	13.2	13.1	11.4	10.5	10.6	10.7	11.0	11.2	12.3	13.0	13.3
Information and communication	2.7	2.4	2.2	1.8	1.9	1.8	2.2	1.7	2.3	2.7	3.3
Financial and insurance activities	2.7	3.4	3.8	4.3	5.2	4.4	4.7	6.5	8.4	8.9	9.4
Real estate, professional, administrative and support services activities	5.1	4.7	4.1	4.1	4.5	4.6	4.8	3.9	3.6	3.9	4.0
Public .administration and defence; social security	4.8	5.9	6.3	7.0	7.0	7.0	6.8	5.9	5.4	5.3	5.4
Education	3.7	3.9	3.9	4.2	4.3	4.1	4.3	3.6	3.6	3.7	4.0
Health and social work	1.4	1.4	1.3	1.4	1.6	1.3	1.3	1.1	1.0	1.2	1.4
Community personal and social services activities	3.7	3.7	3.6	3.7	4.0	3.9	3.7	4.3	4.1	3.8	3.7
Trade; Repair of vehicles, household goods	6.4	6.1	6.0	5.9	6.2	5.9	5.6	5.8	5.6	6.1	6.4
Hotels and restaurants	5.0	5.6	6.0	6.2	6.0	5.4	4.8	5.8	5.6	5.8	5.9
Transport and storage	13.2	13.1	11.4	10.5	10.6	10.7	11.0	11.2	12.3	13.0	13.3
Information and communication	2.7	2.4	2.2	1.8	1.9	1.8	2.2	1.7	2.3	2.7	3.3
Financial and insurance activities	2.7	3.4	3.8	4.3	5.2	4.4	4.7	6.5	8.4	8.9	9.4
Real estate, professional, administrative and support services activities	5.1	4.7	4.1	4.1	4.5	4.6	4.8	3.9	3.6	3.9	4.0
Public .administration and defence; social security	4.8	5.9	6.3	7.0	7.0	7.0	6.8	5.9	5.4	5.3	5.4
Education	3.7	3.9	3.9	4.2	4.3	4.1	4.3	3.6	3.6	3.7	4.0
Health and social work	1.4	1.4	1.3	1.4	1.6	1.3	1.3	1.1	1.0	1.2	1.4
Community personal and social services activities	3.7	3.7	3.6	3.7	4.0	3.9	3.7	4.3	4.1	3.8	3.7

Source: GSS, 2016

Undoubtedly, the Ghanaian service sector has contributed tremendously to the growth of the Ghanaian economy over the years. The sector has experienced major developments and has increasingly expanded. Aside from the direct consumption of services by the increasing population, the sector also provides auxiliary outputs to the manufacturing firms that increasingly depend on external sourcing of such basic inputs as communication, transportation, financial services, etc. (WTO, 1997)

For these striking performances to be sustained, Ghanaian service firms would have to constantly innovate in order to meet and even determine consumer needs. As such, using marketing analytical tools, fed by large quantity of consumer data represents the first step in accurately predicting ang providing "close to perfect" consumer demands.

2.2 Information Communication Technology

Information Communication Technology (ICT) refers to technologies that provide access to information through telecommunications. ICT is presented by Beckinsale and Ram as "any technology used to support information gathering, processing, distribution and use". Basically, it can be seen as, "consisting of various forms of technologies, not limited to basic software or hardware telecommunication, devices and applications utilised in the creation, analysing, processing, distributing, retrieving, storing, transmitting or receiving information electronically in a digital form such as computers, email, internet, websites, social networking and other wireless communications devices, networks, broadband, and as well as the various specialized devices and applications associated with them, such as satellite systems and videoconferencing" (Porter and Millar, 1985; Brady, Fellenz and Brookes 2008, Nicol, 2003).

Similarly, Levitt (1992), presents that technology is a powerful force driving the world towards a converging commonality. It has existed from the beginning of human era, as one

of the most essential and most important factors for the development of mankind (Coombs et al., 1987). Innovations in information processing, telecommunications, and related technologies – known collectively as "Information Technology" (IT) or sometimes Information Communication Technologies (ICTs) – is defined by Ige (1995), as the modern handling of information by electronic means, which involves its access, storage, processing, transportation or transfer and delivery. IT including computer-based information systems used by an organisation and their underlying technologies have propelled changes within various sectors (Goldhaber, Langdon and Clarkson, 2012). Technological innovation for that matter affects not just individual service sectors but also the direction of an economy and its capacity for continual and sustainable growth.

ICT is an important tool that provides the opportunity for businesses and organisations to improve their competitiveness in business arena. In this continuously evolving business environment we now exist, organisations are rapidly adopting ICT techniques in their bid to remain competitive while expanding on their consumer base, with the purpose of setting up wider global networks. The efficient utilisation of Information technology and information systems provides organisations with numerous benefits mainly with the goal of improving core processes and overall business outcomes. It is fair to say that information and communication technology (ICT) has had tremendous effect on business practices and processes globally, leading to transformations in areas such as a faster turnaround of products and production, smart products, and 24 hours of shopping around the world. Businesses are re-engineering their processes and investing huge sums of money in ICT solutions such as Customer Relations Management (CRM) systems and Enterprise Resource Planning (ERP), in order to take advantage of the changing environment

2.2.1 Information Communication Technology in Ghana

As one of the first countries to implement widespread liberalisation in basic telecommunications services in 1994, the government of Ghana has been serious in efforts to pursue a 'knowledge-based economy' agenda to make the country an attractive information and communication technology (ICT) destination markets to generate growth and innovation in the sector (Woldie, Hinson, Iddrisu and Boateng, 2008). According to the International Data Corporation (IDC), the Ghanaian ICT market is more mature in comparison to other West African countries with much of the rhetoric being that internet enabled technology has enabled progress (Hinson and Amidu, 2006). Several authors (Hinson, 2005; Abor and Hinson, 2005) have claimed that ICT progress will result in information literacy and that ICT advancement has been at the heart of economic health and social improvement. However, internet access and other infrastructure needs for technological advancements are not readily available in Ghana.

In January 2013, Ghana was ranked as the country with the highest mobile broadband penetration in Africa, according to an International Telecommunications Union (ITU) report. According to the Measuring Information Society Report released in the last quarter of 2012, mobile broadband penetration surged from 7% in 2010 to 23% in 2011.

The internet world statistics (2015) indicated that internet usage statistics for the world is estimated at 3,035,749,340 with a penetration rate of 42.3% as at June, 2014. Likewise, the assessed populace of Africa in 2014 was 1,125,721,038 of which 297,885,898 were internet users (Internet world stats, 2015). By 1996, Ghana had three competing ISPs users. Although Ghana was the first SSA to have access to the internet, internet penetration did not progress rapidly until 2005 (Quarshie & Ami-Narh, 2012). This could possibly be attributed to the Government's ratification and adoption of Information and Communication Technology for Accelerated Development (ICT4AD) in the year 2004 (Quarshie & Ami-

Narh, 2012). The international telecommunication union (ITU) statistics and internet world stats (IWS) shows that Ghana has seen a steady rise in the internet penetration rate. Table 2.2 also reveals that there seems to be a correlation between population growth and internet usage.

Table 2.2: Population Growth and Internet Usage in Ghana

YEAR	Users	Population	% Pen.	Usage Source
2000	30,000	18,881,600	0.20%	ITU
2005	368,000	21,029,850	1.60%	ITU
2006	401,300	21,801,662	1.80%	ITU
2007	609 800	21,801,662	2.80%	ITU
2008	880,000	23,382,848	3.80%	ITU
2009	997,000	23,887,812	4.20%	ITU
2010	1,297,000	24,339,838	5.30%	ITU
2011	2,085,501	24,791,073	8.40%	ITU
2015	5,171,993	26,327,649	19.60%	IWS

Source: (Internet World Stats, 2015; Quarshie & Ami-Narh, 2012)

2.2.2 Impact of ICT growth on data and analytics development in Ghana

From digital banking to e-commerce, technological innovations have changed the landscape of livelihood and how business is done in Africa. The growth of innovation and technology is pushing the bars high across the continent especially the three main hubs; Lagos, Nairobi and Cape Town. For a continent that was mostly seen as largely undeveloped, the rise of a new wave of tech entrepreneurs across the continent has caused an eruption of tech solutions in addressing the basic needs of the people.

The growth of this space has been greatly influenced by the increased levels of mobile connections across the continent. Rapid smartphone adoption in large mobile phone markets like Nigeria and Kenya significantly changed the continent's tech-savvy youth, ushering in revolutions in a myriad of sectors. the impact of Internet access via mobile devices on the continent has been a game changer. This has given birth to the growth of e-commerce, fintech, educatech, healthtech, and agritech across the continent.

Due to the rapidly interconnectivity of networks and technological devices, the business and social landscape is rapidly evolving. Now more than ever, as society embraces the need and utilisation of data, the Ghanaian economy and landscape must be driven towards the adoption and development of data infrastructure and analytics. Just like when Ghana joined the oil producing nations and it was heralded as an avenue for potential economic transformation, data is similarly refered to as the "new oil", thus ensuring it remains and exist as a potential source of new wealth. However, just in the manner of crude oil, data needs careful and planned management and supporting architecture to be transformed into a valuable commodity.

As mentioned earlier a major benefit from the tremendous growth in information technology has been the massive amount of information or consumer data now available to organisations. The International Data Corporation presents that analytics and big data revenues for the Middle East and Africa region amounted to $1.98 billion in 2016, with the amount projected to further rise to about 2.2 billion in 2017 and steadily reach 3.20 billion in the year 2020.

According to the Gartner research firm, majority of data being generated and produced is not being utilised in ensuring value is created or key decisions are made. Additionally, that there is likely to be an 800% growth in the data developed over the next five to seven years.

However, over 80% of that data, made up social media, health records, sensor readings, e-mail messages, web pages and a lot more would exist as unstructured data (www.gartner.com).

Technology analysts present that some private and government organisations of major West African economies such as Ghana and Nigeria have recently been driving digital transformation in the African Region, even though South Africa accounts for majority of investments into big data and analytics technology in Africa. Essentially, the rapid development and rise of cloud and cognitive computing is presented as a major revelation from the global technology growth.

Cognitive computing is used in reference to "next-generation" information systems built in order to facilitate the speeding advancement of human expertise. Altogether, these systems have the capacity to evolve and assimilate huge volumes of information, aimed at communicating and naturally interacting with humans. Their capacity in understanding and processing large volumes of data of various domains ensure that they are important in transforming the business landscape

Cloud computing refers basically to the provision of Information technology services and solutions through the internet. In order to deal with huge amounts of data, it is expected that key Ghanaian technology experts rely and adopt policies which enhance the utilisation of cloud computing. However, before the implementation and adoption of cloud services, key issues to consider include how safe sharing of organisational information can better consumer experience while protecting that information from various threats. How can vital information be extracted, and what information would serve as useful or not? Additionally, thought must also be given to the various structures and systems in place to support the successful adoption and utilisation of the information.

With fore knowledge that transformation into a digital economy involve a long and steady process, there is the need to ensure that tremendous effort and investment is made towards the achievement of the objective

2.3 Organisation Profile

2.3.1 MTN Ghana

MTN is an emerging market mobile operator at the forefront of technological and digital changes with its headquarters in Johannesburg. Established in South Africa in 1994, the MTN Group is a leading emerging market operator, growing rapidly by investing in advanced communication infrastructure and by harnessing the talent of our people. Services of the MTN Group include voice, data and digital services to retail customers in the 22 countries in which our operations have telecoms licenses. The Group also offer enterprise solutions to corporate and public-sector customers in a total of 24 countries. The brand ranks as one of the most admired brands in Africa as well as among the most valuable African brands (www.mtn.com).

With over 20 million subscribers representing 49.1% of the telecommunication market share, Scancom Plc, popularly known as MTN Ghana is the leading telco operator in Ghana. The wide range of services offered by the organisation include voice, data, mobile financial and other digital services to customers across all regions in the nation.

Scancom Ltd (MTN Ghana) was incorporated in 1994 as a private limited liability company. Pursuant to its initial public offer (IPO), the regulations of Scancom Ltd were amended in 2016 to become a public company (https://africanfinancials.com/company/gh-mtn/). Its shares were listed on the Ghana Stock Exchange (GSE) on 5 September 2018, making it the largest company on the GSE by number of Ghanaian shareholders, 127,826, by value of Ghanaian shares of Gh¢444 million, and the third largest primary listed company by Market

Capitalisation of GH¢9.7 billion. MTN Ghana is part of the MTN Group, a leading emerging market mobile operator. MTN Group has operations in 21 countries in Africa and the Middle East.

MTN Ghana is at the forefront of technological and digital change, with over GH¢800 invested in their network in 2018. To maintain relevance and to keep up with the dynamism of the telecommunications industry, MTN continually innovates, creates and builds meaningful relationships by continually mining and utilising customer information to improve overall customer experience.

MTN Ghana has additionally championed economic growth and social development of societies and by launching various projects such as the Rural Telephony Project in partnership with GIFEC and Huawei, it has succeeded in extending telecommunications services to previously unreached areas of over 300 communities nationwide.

Since its establishment MTN Ghana's Foundation has invested over $13.5 million (GH¢32 million) in 142 major sustainable projects countrywide in the areas of education, health and economic empowerment.

2.3.2 Ringiers Africa Digital Publishing (RADP)

Ringier entered the African market in 2011 with a clear focus on capitalizing on the massive digital potential of the market. Few years later, Ringier Africa is operating the leading classifieds and media groups on the continent - ROAM (Ringier One Africa Media) and RADP (Ringier Africa Digital Publishing). The organisation boast of business operations in Nigeria, Ghana, Senegal, Côte d'Ivoire, Kenya, Tanzania, Uganda and Ethiopia and our brands have achieved notable success and market leader positions in these markets (https://www.ringier.com.gh/en/about-ringier/activities/about-ringier-africa).

2017 was another year of high growth for Ringier's integrated media business in Africa. Ringier Africa Digital Publishing (RADP) is believed to now reach over 100 million users per month across its Sub-Saharan African markets and platforms with its local love-brand, "Pulse" and exclusive, world-renowned publishing license brands, such as "Business Insider" and "Men's Health / Women's Health", promising more brands to come. This user reach represents a 4-time increase in the last twelve months. On the commercial side, both RADP and its fully client- and market-development focused sub-brand Ringier Digital Marketing (RDM) have been successfully serving over 600 clients – from advertisement to media production to digitalization of entire marketing funnels. It has grown services to cater for both the largest companies across Africa and SMEs (https://techpoint.africa/2018/03/01/ ringier- africa-digital-publishing).

Overall, the group – the second pillar of Ringier's involvement in Africa, besides its sister company in the classifieds/marketplaces space, Ringier One Africa Media (ROAM) – has now established their brands and is serving clients with teams on ground in three key African markets, Nigeria, Ghana and Kenya, as well as many satellites in French-speaking Africa through Senegal and English-speaking Africa through Kenya. Highlights of the group are its strong video position with "Pulse TV", with over 90 million video views per month; "Pulse Network", working with different third-party partners to develop and monetize their content and platforms as well as «RDM» and its creative "Play Studio" team working with clients on 360 degree marketing set-ups (https://www.ringier.com/en/press-releases/corporate/digital/ringier-africa-digital-publishing-radp-expands-rapidly-2017).

2.3.3 Jumia Ghana

Shares in Africa's largest e-commerce firm, Jumia, debuted on the New York stock market in March 2019, with Jumia listing 17.6% of the company at $14.50 a share, giving the

company "unicorn" status - a technology start-up worth $1bn-plus. It becomes first tech start-up from Africa to float on Wall Street. The so-called "Africa's Amazon" has 4 million customers on a continent where just 1% of retail sales are via online. In 2016, it was valued at $1bn (£800m) (https://www.bbc.com/news/technology-47553656).

Jumia, Africa's largest online retailer was founded in Lagos, Nigeria, by two French entrepreneurs, Jeremy Hodara and Sacha Poignonnec, in 2012, and now offers services to most of the African population, with its largest shareholder being MTN, Africa's biggest telecoms company.

Jumia operates in 14 countries, including Kenya, Ghana, Algeria, Angola, and Senegal. The website sells everything from electronics to clothes, and there is a hotel and flight booking site, and a takeaway food delivery platform.

In Kenya, Jumia has teamed up with French supermarket giant Carrefour to offer online deliveries. It had four million active consumers at the end of 2018.

In Ghana, Jumia, the Rocket Internet backed e-commerce platform which launched sometime in 2013, and to a large extent, has enjoyed tremendous success in Ghana's e-commerce space. Jumia debited in the Ghanaian market at a time where e-commerce was relatively new and was gradually introduced to the Ghanaian populace (https://technovagh.com/2017/10/04/evolution-jumia-ghana/).

Starting of as Jumia.com.gh, it was a primary e-commerce platform for everything retail. They eventually went on to launch Jumia Market (which eventually left Ghana), Jumia house, Jumia Cars, Jumia Food and Jumia travel; brands which have also enjoyed a certain amount of reach and success over the years.

Probably Ghana's largest e-commerce store, Jumia entered into the Ghanaian market to fill a gap in the business ecosystem. Launching at about the same time as their competitor,

Tonaton.com, Jumia has maintained its brand's footprints, by retailing authentic products, offering retailers variety, pioneering a delivery service and consistently evolving the way e-commerce is approached in Ghana (https://www.modernghana.com/news/684692/jumia-ghana-to-boost-economy-with-e-commerce.html).

With a website that enjoys about 70,000 unique visitors daily, making them 5th most viewed local content site in Ghana, Jumia.com.gh has definitely proved to be a leader in Ghana's E-commerce space. With the emergence of other players, automatically shrinking their market size, the company continually strives to evolve and adapt to new technologies in terms of Ghana's fintech space, generally staying ahead of the competition.

The Jumia brand has fared well in Ghana with most of their offerings have been widely accepted, a few have been sceptically approached, but in all, the brand has not only led the E-commerce revolution in Ghana but has been innovative about it (https://www.jumia.com.gh/about_us/).

Jumia Ghana, the leading e-commerce platform in Africa with a presence in 11 countries does not only provide customers with the luxury of shopping from any location but delivers the items right to customers' doorsteps through timely interventions.

Although there are technical and infrastructure hurdles to growing Africa's online retail market, the company has continually expanded with services such as mobile money payments now accepted across a continent where few people have credit or debit cards.

2.3.4 AirtelTigo

Mobile phone use has steadily become a necessity of life, allowing users to communicate seamlessly others. The number of mobile subscriptions in Ghana was expected to continually grow penetration rate of 137 per cent at the end of July 2018.

Telecommunication service providers are constantly adopting innovative business models to meet the increasing and diverse needs of subscribers.

Airtel and Tigo, two telecommunication service providers in Ghana merged and launched in November 2017 to deliver a network with a much wider coverage, faster internet speeds and enhanced voice quality to subscribers and its customers across Ghana (https://www.ghanaweb.com/GhanaHomePage/business/What-is-AirtelTigo-up-to).

The merger, which is the first of its kind in Ghana, represented a ground-breaking move in the country's telecommunications industry. Aside from increased resources, the merger made AirtelTigo the second largest mobile network with a subscriber base of 10 million, AirtelTigo is a solid, dynamic and innovative brand, providing a wide range of telecommunications services, including mobile voice, data mobile financial services and business connectivity solutions. AirtelTigo's goal is to create a fully integrated mobile network that will provide reliable and quality network experience to individuals, businesses, and communities across the country.

To achieve this objective, a network unification process was implemented, resulting in AirtelTigo investing significantly in the consolidation and upgrade of its network assets in order to improve network coverage along with better voice quality and internet speed (https://www.biztechafrica.com). The business aims to ensure it has a combined fibre footprint and an increased number of data centres, large corporations and SMEs in order to offer to a diverse portfolio of world-class solutions from AirtelTigo Business.

AirtelTigo Money, their Mobile Financial Service, is also expected to be greatly enhanced with the company actively pursuing collaboration with the government and international development organisations to develop a range of mobile-based solutions to address a variety of social economic challenges facing Ghana.

CHAPTER THREE

LITERATURE REVIEW

3.0 Introduction

This chapter presents a review of literature relevant to the topic under study. Reviewed literature covers Big Data and its characteristics, analytics and marketing analytics, the history of analytics in marketing, types of analytics, benefits associated with the use of marketing analytics and the underlining theory underpinning the study.

3.1 The Evolution of Analytics

Marketing science has a long tradition of embracing new challenges, new methods, and new discipline, synthesizing solutions from a variety of disciplines to provide new insight to marketing problems (Chintagunta, Hanssens and Hauser, 2016). These changes which are inevitable, according to Morosan, Bowen and Atwood (2014), are as a result of the role of research in the academic array of activities and an increasing symbiotic relationship with the industry (e.g. acuteness of industry marketing problems, industry–academic partnerships).

Jones and Tadajewski (2010): Drozdenko and Drake, (2002) present that advances in the areas of quantitative and qualitative research has greatly improved the marketer's understanding of the marketplace, competition and most importantly the customer, resulting in the provision of better services and products.

Data has been vital in marketing over the years. The availability of data ensures organisations can analyse and predict marketing outcomes before decisions are taken. The sudden explosion had resulted massively in the advancement of analytics in business. With Big Data came the advancement of analytical tools and techniques that operate on Big Data

sets and comprises both Big Data and Analytics to generate insightful trends in business that facilitate advanced and competitive decision-making processes (Russom 2011, Chen, Chiang and Storey, 2012). As such, Chaudhuri, Dayal and Narasayya, (2011) present that the progression analytics of large or big data sets is steeped in historical database management and warehousing field, which relied on distinctive modes of information accumulation, extraction and analysis technologies.

There exist arguments as to the when the application of analytics began in marketing. Bartels (1988) suggest that the history of the systematic use of data in marketing begins majorly in 1910, with the work of Parlin for the Curtis Publishing Company in Boston. Bartels (1998): Wendel and Kanaan (2016), present that Parlin assembled information on markets with the idea of directing advertising and other business practices, encouraging several major US businesses to establish commercial research departments. Businesses were known to apply external data to already existing internal data by various departments in making decisions. However, Winer and Neslin (2014) suggest that the initiative of the Ford Foundation and the Harvard Institute of Basic Mathematics for Applications in Business in 1959/1960 is widely credited for having provided the major impetus for the application of analytics to marketing, leading to the establishment of the Marketing Science Institute in 1961. Even though, statistical methods (e.g., analysis of variance) were known to have been utilised in marketing research for a decade (Ferber, 1949), the utilisation and adoption of statistical and econometrics models suited purposely for understanding and dealing with marketing related issues was established by the acceptance of marketing as a documented field of decision making through the Ford/Harvard initiative (Bartels 1988).

Questionnaire survey research, which were even now utilised in the 1820s in opinion surveys become increasingly popular in the 1900s, leading to the psychology related models such as Starch's (1923) Attention, Interest, Desire, Action (AIDA), and Maslow's (1943)

hierarchy of needs adopted into the field of marketing to usher and present an in-depth understanding of customers (Wedel & Kannan 2016).

In 1923, A. C. Nielsen, a forerunner of market research, was established with its prime emphasis being the measurement of product sales in stores. Establishing a business foothold by analyzing retail food and drug sales represented the company's largest and most profitable operation. A.C. Nielsen Co. entered the radio program rating field in 1942 but became best known to the general public for its television rating service, which from 1950 gauged the popularity of television shows. (www.britannica.com). This rating system was based on a sampling of more than 1,000 television homes scattered around the United States, with each member of the sample having a small box, called an Audimeter, attached to the set, which recorded when the set was on and what channel was tuned in. These data were relayed to a computer centre, which also collected data from viewing diaries kept by a smaller sampling of households. Based on such information, total audience for each program, as well as the age and sex of the viewers was projected or determined.

White (1931) presents that organisations such as GfK in Germany and Burke in the United States, founded in the 1930s were primarily engaged in product testing (reference), with the next decade witnessing an increase in the upsurge of field experimentations and the improved utilisation of telephone surveys.

Moreover, a study by Stonborough (1942) provided evidence of the increasing use of panel data, initially for measuring media exposure, later used for recording consumer purchases. Winer and Neslin (2014) presents that companies' use of the own customer data was stimulated around 1961 by Cullinan, in his introduction of "Recency, Frequency, Monetary" (RFM) measurement systems which were core in CRM (Customer Relationship Management). In 1966, the SAMI (Selling Areas Marketing Institute) was established,

which aimed at utilising warehouse withdrawal data. Casher (1969) Computers role and nature as being vital in marketing research was intitally identified at this point.

Wendel and Kannan (2016) present that at this time, the introduction of the Universal Product Code (UPC) code and IBM's computerized POS (Point of Sale) scanning devices in food retailing in 1972 represented the foremost automatic acquisition of consumer data by retailers. Organisations such as Nielsen rapidly identified the prospects in utilising POS scanner data in various consumer studies and as such substituted bi-monthly store audits with granular scanner data. As such, individuals and customers could be identified with loyalty cards, with this leading to the advent of scanner panel data (Guadagni 1983). IRI (Information Resources, Inc.), which since its inception in 1979 measured TV advertising, rolled out its in-home barcode scanning service in 1995.

Analytics capabilities were grounded in statistical methods from the 1970s, after which the capability evolved from structured database-managed content to the unstructured contents from Web 2.0, and eventually to the recent mobile- and sensor-based content (Chen et al., 2012).

The use of internal customer data was greatly propelled by the introduction of the personal computer (PC) to the mass market by IBM in 1981. The PC allowed marketers to store data on current and prospective customers, which contributed to the emergence of data-base marketing, pioneered by the Kestnbaums and Shaw (1987). CRM software emerged around 1990, for which earlier work on Sales Force Automation at Siebel Systems paved the way. The PC also facilitated survey research via personal (CAPI) and telephone (CATI) interviewing.

In 1995, the world-wide-web came into existence after more than two decades of development at the Defense Advanced Research Projects Agency (DARPA) and other organisations

By 1994, the world wide web had become the second most popular service on the Internet, and it moved into first place by early 1995 (Crossman, 1997). This led to the availability of large volumes of marketing data. Click-stream data extracted from server logs were used to track page-views and clicks via cookies. Click-through data yielded measures of the effectiveness of online advertising. The internet stimulated the development of CRM systems by firms such as Oracle, and in 1999 Salesforce was the first company to deliver CRM systems via cloud computing.

In 1998, the launch of Google championing key-word search and the capture of search data and the advent of user generated content (UGC), including online product reviews, blogs and video, resulted in increasing volume and variety of data. The launch of Facebook in 2004 opened an era of social network data. Vast amounts of data in the form of text and video uploaded by users, with the advent of Youtube in 2005, became the raw material for behavioral targeting. Twitter, with its much simpler 140-character messages, followed suit in 2006. Smart phones existed since the early 1990s, but the introduction of the Apple iPhone in 2007 with global positioning (GPS) capabilities marked the onset of the capture of consumer location data at an unprecedented scale.

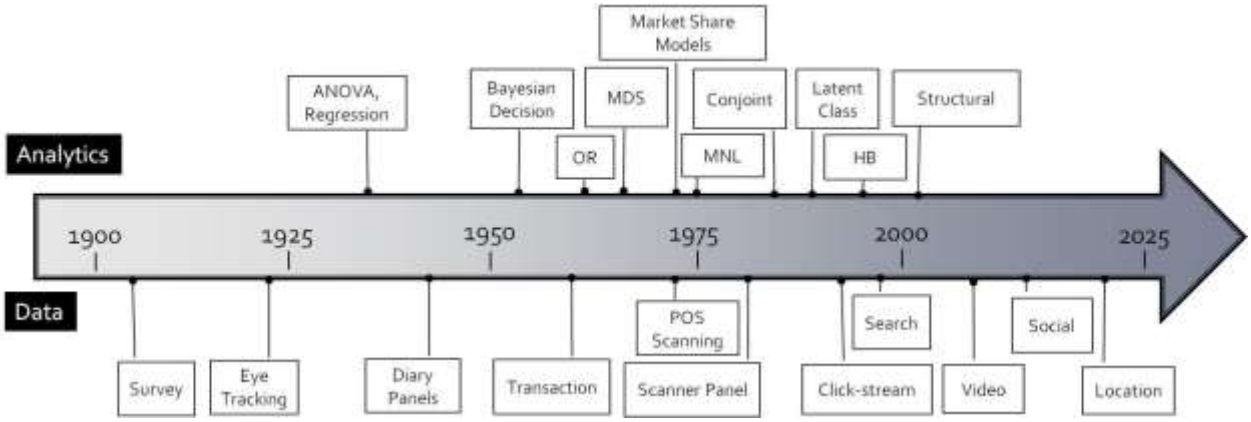


Figure 3.1: An Outline of the Timeline of Marketing Data and Analytics

Wendel and Kannan 2016.

This timeline summarizes the availability of new marketing data and the development of the major classes of marketing models. As new types of data became available, new models to analyse them followed.

3.2 The Concept of Big Data

The concept of Big Data was purported to have first appeared in the late 90s (Cox and Ellsworth, 1997; Blazquez and Domenech, 2018) and characterized along the three important dimensions of the 3Vs model; Volume (size of data), Velocity (speed of data transfers), and Variety (different types of data, ranging from video to data logs for instance, and with different structures) (Laney, 2001). Jacobs (2009) additionally emphasised mainly on the storage and analysis requirements of dealing with Big data. However, understanding of big data and data science has continually evolved, with precise meanings and applications continually unfolding in academic and organisational settings (Alharthi, Krotov and Bowman, 2017).

Over time, definitions of Big data have evolved to incorporate more than the 3 Vs (Furht and Villanustre, 2016), utilised as an underlying defining framework, with authors such as Chen, Chiang, & Storey, (2012); Oussous, Benjelloun, Lahcen and Belfkih (2018)

presenting that even though early definitions focused on the size of data in storage, which may have given rise to the name "Big data", there existed other important attributes of big data, which constituted a comprehensive definition, busting the myth that big data is only about data volume (Kwon, Lee, & Shin, 2014). Recognising this, definitions of big data in present years have become much more intricate, Bello-Orgaz, Jung and Camachom (2016), with authors such as White (2012) expounding on the definition in terms of five Vs: volume, velocity, variety, veracity and value while additional definitions by IBM (2012), Johnson (2012), and Davenport et al. (2012) all focused more on the variety of data sources.

Chen et al., (2012), argues that the as the term big data is utilised in categorising data sets which are extremely large (terabytes to exabytes), unstructured, and complex (from genome analysis, political science, sensor, social media, or smartphone apps, to Internet based gadgets data) and can only be stored, managed, analysed and visualised with progressive and advance technologies Lansley & Longley (2016) postulate that Big Data exist in the form of structured data, such as organisations traditional databases (e.g., customer relationship management) or unstructured data, driven by new communication technologies and user editing platforms (e.g., text, images and videos) availability, Forrester (2011) defining big data as "techniques and technologies that make handling data at extreme scale affordable." while Gartner IT Glossary (2017) define Big data as "high-volume, high-velocity and high-variety information assets that demand cost-effective, innovative forms of information processing for enhanced insight and decision making. All the definitions elucidate big data as large volumes of high velocity, complex and variable data that require advanced techniques and technologies to enable the capture, storage, distribution, management, and analysis of the information." (TechAmericaFoundation's Federal Big Data Commission, 2012; Gandomi and Haider, 2014).

Additional definitions by various authors such as Kaisler, Armour, Espinosa amd Money, (2013); Chen & Zhang, (2014) explain Big Data as "the amount of data just beyond technology's capability to store, manage and process efficiently", and as a collection of large amounts of complex data that cannot be managed efficiently by the state-of-the-art data processing technologies respectively. IDC (2013), explains that big data focuses on three main characteristics: the data itself, the analytics of the data, and the presentation of the results of the analytics that allow the creation of business value in terms of new products or services. A conclusive factor is that the term "Big data" is used currently to describe the massive volume of digital data produced by human activity that is very difficult to manage using conventional data analysis tools

Given the expected growth of data in the coming years (40% per year, and 50 times by 2020) (Waal-Montgomery, 2015), key to organisations' success would be its understanding and implementation of the large amount of data available in making key marketing decisions.

3.2.1 Characteristics of Big Data

Based on most definitions of Big Data, the 3 Vs (volume, velocity and variety) are often the underlying features in defining it. However, veracity and value are increasingly are now key factors for in explaining what it is.

3.2.1.1 Volume

Lee (2017), identifies volume as referring to the amount of data an individual or organisation generates an individual. It represents the characteristic that can be easily related to big data, since this term explicitly refers to the size of the phenomenon, i.e. the large amount of data available. The volume of Big Data is currently measured in petabytes, exabytes, or zettabytes with one petabyte equivalent to 20 million traditional filing cabinets of text (McAfee & Brynjolfsson, 2012). IDC (2014) presents that the explosive growth in the

volume of data can be somewhat attributed to the Internet of Things (IOT), whereby computerization is incorporated into cars, toys, appliances, with about thirty-two billion objects expected to be connected online by 2020, with social media platforms and electronic commerce platforms also responsible for the generation of massive volumes of unstructured data in the forms of audio, images, and video (Lee, 2017). Even though volume represents a unique feature of Big Data, most organisations possess massive data sets that lack the other characteristics of Big Data (velocity and variety) (Erevelles, Fukawa and Swayne, 2016). It is estimated that the global market for software, hardware, and services for storing and analysing Big Data would double in size every 2 years (IDC, 2014), due to organisations effort to in reining in the challenge of ever-increasing Big Data volume.

3.2.1.2 Velocity

According to Lycett (2013), velocity refers to the speed at which data is generated and processed with, explaining it as the relentless rapidity of data creation. Lee, (2017) presents that due to velocity increasing over time, real time processing has now become a norm for computing applications, far different to the initial slow and expensive nature of processing data In 2016, 5.5 million new devices were estimated to be connected every day to collect, analyse, and share data, as such, the enhanced data streaming capability of connected devices will continue to accelerate the velocity (Gartner, 2015)

3.2.1.3 Variety

Variety deals with the number of data types available, with technological advances allow organisations to generate various types of structured, semi-structured, and unstructured data. (Lee 2017). A key change in contemporary Big Data and traditional data is the shift from structured transactional data to unstructured behavioural data (Integreon Insight, 2012), with Erevelles, Fukawa and Swayne, (2016) presenting that much unstructured data is captured through social media, where individuals share personal and behavioral information with

friends and family Structured data includes data from a scanner or sensor data, records, files, and established databases which may have been collected by marketers for some time while unstructured data include textual data (e.g., from blogs and text messages) and non-textual data (e.g., from videos, images, and audio recordings).

3.2.1.4 Veracity and Value

According to literature, two key additional characteristics of Big Data; "veracity" (IBM, 2010) and "value" represents the unreliability and uncertainty latent in data sources and the transactional, strategic and informational benefits of big data respectively. (Wamba, Akter, Edwards, Chopin, and Gnanzou 2016; Wixom, Yen and Relich, 2013).

Constantiou and Kallinikos (2015), posit that all these characteristics make big data difficult to process using existing technologies hence the continuous development of new data processing technologies. Additionally, soaring number of internet-connected devices and social media platforms have presented organisations with issues dealing with the hundreds of thousands of streaming data sources (Côrte-Real, Oliveira, Ruivo, 2017), that demand real-time analytics of which traditional data management systems are not capable of handling instantaneously. This, accordingly, is where big data technologies come into play (Gandomi and Haider, 2015), as it presents firms with the opportunity to create real-time intelligence from high volumes of 'perish-able' data.

In general, big data is perceived as a source of innovative products, services, and business opportunities (Davenport et al., 2012; Davenport and Kudyba, 2016; McAfee et al., 2012) and result in more efficient and effective operations by; optimizing supply chain flows; setting the most profitable price for products and services; selecting the right people for certain tasks and jobs; minimizing errors and quality problems, and improving customer relationships (Chen et al., 2012; Davenport, 2006; McAfee et al., 2012). Also, further

economic and social value can be gained from big data through enhanced decision making (Sharma, Mithas and Kankanhalli, 2014) and more informed strategizing (Constantiou and Kallinikos, 2015). By adopting advanced analytics technologies, organisations can use big data for developing innovative insights, products, and services (Davenport et al., 2012). By adopting big data technologies, organisations expect to gain benefits across many domains, such as e-commerce, e-government, science, health, and security (Chen et al., 2012). What benefits organisations perceive as ‘‘value” depends on their strategic goals for adopting and using big data (Ghoshal, Larson, Subramanyam and Shaw, 2014).

3.3 Marketing Analytics

Organisation such as Wal-Mart have been praised as forerunners in their application large volumes of consumer data and analytics to inform organisation decision processes across the various functional areas—without a particular focus on sales and marketing but across other areas such as supply chain management, accounting and finance and human resource management (Wedel and Kannan, 2016). The use of analytics in marketing is known as marketing analytics. There exist numerous definitions of marketing analytics in literature.

Hitachi Consulting Group (2005), define marketing analytics as “a focus on coordinating every marketing touch point to maximize the customer experience as customers move from awareness, to interested, to qualified, to making the purchase.”. Lilien, (2011) presents it as a “technology-enabled and model-supported approach to harness customer and market data to enhance marketing decision making”, with (Germann, Lilien and Rangaswamy, 2013) arguing that marketing analytics consist of two types of applications: those that involve their users in a decision support framework and those that do not (i.e., automated marketing analytics). Wendel and Kannan (2016), define marketing analytics as involving d

Another definition of marketing analytics provided by Wendel and Kannan (2016), is that marketing analytics involves the collection, management, and analysis – descriptive, diagnostic, predictive and prescriptive – of data to obtain insights into marketing performance, to maximize the effectiveness of instruments of marketing control, and optimize their return on investment (ROI), whiles presenting it as the nexus of marketing with other areas of the business function. From the various definitions in literature, marketing analytics involves the primary focus on acquiring sufficient customer data in order to enhance marketing decisions while increasing profitability.

Germann, Lilien and Rangaswamy (2013), posit in literature that there exist numerous advantages an organisation derives from the use of marketing analytics in; some of which include improved decision consistency (Natter, Mild, Wagner and Taudes, 2008), explorations of broader decision options (Sinha & Zoltners, 2001), and an ability to assess the relative impact of decision variables (Silk & Urban, 1978). Russo & Schoemaker, (1989) however present that the common theme in this literature with regards to the benefit of marketing analytics is the improvement in the overall decision-making process. Evidently, the use of marketing analytics most often ensures the creation of customer value by equipping marketers with real time information on the needs and wants of customers as well as to evaluate impressions of products and services.

Various authors such as Venter and Tustin (2009): Davenport (2006) are nonetheless quick to point out that using analytics is not without its own problems. They present that decision makers have challenges in using analytics because the data is not proactively available, so they often must go through a painstaking process in order to render it useful. Davenport (2006) also opined that there is indeed some tension when it comes to using metrics and measurement outcomes to make decisions as opposed to the creativity and entrepreneurial impulses that marketing as an art form is known for, with Peters and Waterman (1982)

additionally argue that the use of analytics may result in analogous effect. Harari (1996) suggest that "excessive delays in the name of information-gathering breeds analysis paralysis," leads to missed opportunities and consequently subpar firm performance. These concerns however do not question the effectiveness of analytics as a tool but how it is implemented by users.

3.3.1 Types of Analytics

Philpott and CoE (2010) present that analysis that makes use of Big Data mining technologies and quantitative methods such as mathematical algorithms, statistical computing and stochastic process are generally categorized as "advanced" forms of analysis. As such, Davenport (2012) classifies advanced analytics into three dimensions, as follows:

3.3.1.1 Descriptive analytics

Being the most common type of analytics utilised by businesses, descriptive analytics answers the question as to what happened (IBM, 2013). (Dilla et al., 2010) present that it is typically characterized by descriptive statistics, Key Performance Indicators (KPIs), dashboards, or other types of visualizations. Descriptive analytics summarize what has happened and which also forms the basis of many continuous monitoring alert systems, where transactions are compared to benchmarks and thresholds are established from ratio and trend analysis of historical data.

3.3.1.2 Predictive analytics

Bertsimas and Kallus, 2014) present that predictive analytics represents the next step taken with the knowledge acquisition from descriptive analytics and answers the question of what could happen (IBM, 2013). It is characterized by predictive and probability models, forecasts, statistical analysis and scoring models. Predictive models use historical data accumulated over time to make calculations of probable future events. Research by IBM

(2013) presents evidence to the claim that most businesses predominantly utilise descriptive analytics with predictive analytics now being adopted and utilised.

3.3.1.3 Prescriptive analytics

Prescriptive analytics according to Bertsimas and Kallus, 2014; Holsapple et al., 2014; IBM, 2013; answers the question of what should be done given the descriptive and predictive analytics results. Prescriptive analytics may be described as an optimization approach. Prescriptive analytics go beyond descriptive and predictive by recommending one or more solutions and showing the likely outcome of each (Ayata, 2012). Appelbaum, Kogan, Vasarhelyi and Yan (2017) present that the techniques for predictive and prescriptive analytics may appear similar, but their orientation and ability to prescribe depends on the type and amount of data available for analysis. The more varied the data types, the more likely the solution may be prescriptive. They further present that Prescriptive techniques may utilise quantitative and qualitative data from internal and external sources, with the main difference between prescriptive and predictive analytics not one of required data types, but one of orientation – that is, based on question such as; is this an optimization query or a trend-based analysis?; What are the questions critical to management? (Basu, 2013).

3.4 Big Data Sources for Analytics

IBM, 2016: Bello-Orgaz et al., 2016, present that the “explosion” or “Data Big Bang” is somewhat attributed to have been instigated by the internet and internet of things which continually expands, changing the way we interact in various setting. Blazquez and Domenech, 2018, present that countless queries and post by individuals, entities and organisations results in the creation and generation of large size of data and information on the internet daily, with their actions online leading to the creation of a “digital footprint”, which can be traced and used in predicting consumer behaviour decisions and intentions,

when the right type of Big architecture is utilised (Fan, Han and Liu, 2014; Jagadish, Gehrke, Labrinidis, Papakonstantinou, Patel, Ramakrishnan and Shahabi, 2014; Hashem, Yaqoob, Anuar, Mokhtar, Gani and Khan, 2015). This can be applied in determining vital consumer changes or trends (Blazquez & Domenech, 2017). A study by Askitas and Zimmermann (2015) present that the internet has had a massive role as a developing contributor to massive amounts of data utilised in illuminating, providing meaning to and predicting consumer social behaviour. There exist numerous platforms by which businesses source data in order improve and make analytical decisions.

3.4.1 Social Networking Sites and blogs

Blazquez and Domenech (2018), present that Social Networking Sites (SNS), are online platforms/locations purposely created to enable individuals/users to voice out feelings and opinions on a numerous number of issues. As such, information is an insightful representation of daily occurrences in society. Consequently, data generated through/by SNS and blogs is referred to as "Social Big Data" (Bello-Orgaz et al 2016). As such, there is increased focus is the "harvesting" of SNS as extremely vital data for predicting consumer needs. Aside the fact that Social networking sites create a chance for buyers to assess products, make referrals to contacts, family or companions and connects current buys to future buys through status updates and twitter feeds (Forbes & Vespoli, 2013), access to information on individual encounters and sentiments about products and services represents an added benefit because there is a tendency to acknowledge and utilise online data in decision-making processes (Teng, Khong, Goh and Chong, 2014). This alone makes social media a valuable marketing tool (Boateng, 2014; Forbes & Vespoli, 2013).

Among SNS, Facebook and Twitter are some of the most widely used social networks worldwide, by means of 1,650 million active users daily and over 332 million users

constantly available online posting over 500 million tweets daily (The Statistics Portal, 2016).

Schoen, Gayo-Avello, Takis Metaxas, Mustafaraj, Strohmaier, and Gloor, (2013), posit that the large consumer data produced may be as a result of certain concerns and as such, calls for additional studies to aid marketers make far more precise targeting decisions. Content on some of these SNS can be varied and user-adjustable, making them more complex in their transformation into actionable data.

Nevertheless, emerging research by Arrigo Liberati, Mariani, 2016, has revealed the capability of Facebook in revealing insightful information into consumer patterns, which can be vital in making marketing decisions.

Additionally, major Social Networking Sites such as LinkedIn, Youtube, Instagram, Google+, Tumblr have proved to be extremely vital source of consumer data, vital in discovering subtle tweaks in consumer preference, brand choice or demographic decisions (Russell, 2013).

Nevertheless, these different and somewhat complicated nature of consumer data generated from theses social networking sites, coupled with their newness has resulted in their potential not fully explored and employed.

Blogs represent vital generator of “Social Big Data”. However, Blazquez and Domenech (2018), present that studies linking blogs to predicting consumer behaviour prediction is still developing with early works from Liu, Huang, An and Yu (2007) being part of the few which sought to investigate the importance of consumer opinions, ideas and feelings which were mined from blogs in determining the performance of sales.

Nevertheless, authors such as Thelwall (2007) and Gayo-Avello (2012), argue that these sources are not without limitations, most often being commonly predisposed in favour of a

particular section a population, e.g. Generation x or French speakers, e.g., blogs in non-French lingua link commonly French content vice versa. As such, before generalisations can be made, various measures must be considered.

3.4.2 Websites and Apps

With this Information age, organisations have carefully crafted public images by implementing and utilizing corporate websites. These websites enable the organisation to inform, offer and educate consumers on various offers, their organisation brands, intentions and various organisational projects.

Due to increased customer interactions with customers via digital channels, marketers are now aware of the increasing need to track these interactions and measure their performance (Chaffey and Patron, 2012). As such, businesses are adopting Web analytics (WA), defined as "the measurement, collection, analysis and reporting of Internet data for the purposes of understanding and optimizing Web usage" (Web Analytics Association, 2008). Järvinen and Karjaluoto (2015) present Website Analytics as a tool that collects clickstream data regarding the source of website traffic (e.g., e-mail, search engines, display ads, social links), navigation paths, and the behavior of visitors during their website visits and that presents the data in a meaningful format. The WA data are used to understand online customer behavior, to measure online customers' responses to digital marketing stimuli, and to optimize digital marketing elements and actions that foster customer behavior that benefits the business (Nakatani and Chuang, 2011).

Considering the complexity and variations existing in website structures, gathering and utilising consumer data sourced from these websites require varied forms of Big Data architecture (Kannan, Pope and Jain, 2009; Lodish, Curtis, Ness and Simpson, 1988). This has somewhat attributed to the difficulty in utilising an organisation's website as a potential

source of consumer data. Nevertheless, being public, regularly updated and "business generated" in nature results in them being a latent source of marketing information (Mintz and Currim, 2013; Natter, Mild, Wagner, & Taudes, 2008). Furthermore, studies by Silva-Risso, Bucklin and Morrison, 1999; Zoltners and Sinha (2005), present that key marketing trends developing can be readily determined and discovered through examining organisations websites. Additional studies by Arora, Li, Youtie and Shapira, 2016; Gök Waterworth and Shapira (2015) reveal that the application of Big data techniques (specifically, web data mining and AI) to the dissemination of information function of organisations websites can result in better Research and Development outcomes.

The growing utilisation of various apps by consumers and businesses have resulted in these apps being vital sources of massive amounts consumer data, capable of providing benefits such as being good means for the prediction of consumer behaviour. Altogether, novel research by Wang, Kung, and Byrd, 2016; Suhara, Xu and Pentland (2017), speaks on the numerous benefits on the use of app data logs in predicting consumer intentions. However, it still remains that accessing data on these apps is a problematic task.

3.4.3 Urban and mobile sensors

One of the numerous benefits of the digital development has been the emergence and growth of ubiquitous computing. Krishnan and Cook (2014), point out that these developments have led wireless, inobtrusive and less costly sensors which are constantly collection data on daily occurrences. Narrowed down, these urban sensors and mobile embedded sensors have served as massive source of consumer information in predicting and determining behaviour. An example of a globally utilised urban sensor is the credit card. Possible vital consumer data is recorded and acquired by the organisation when various consumer transactions are made, helping organisations determine issues such as consumer purchasing decisions

(Xiong, Wang, Mayers and Monga, 2013) or online buying behaviour, which can be vital in determining marketing strategies (Einav and Levin, 2014).

Scanners in retail centres which record daily consumer transactions are also vital sources of determining consumer behaviour patterns with research by Dey, Rabbani, Singh and Engle (2014), utilising retail level scanner data in positively predicting changes in consumer and business markets related to catfish products, and recommending a superior plan from data obtained. Additional research by Pandya and Venkatesan (2016), aimed at determining consumer boycotts, utilised weekly scanner data in elucidating individual response

Various sensors (e.g. GSM, GPS, Bluetooth) implanted within electronic devices such as phones serve as means by which organisations can obtain consumer data. All these various sensors are useful in obtaining and acquiring consumer information in studying patterns, behavious and perceptions. Research by Montoliu, Blom and Gatica-Perez (2013); Chittaranjan et al., (2013), have espoused how information derived from these sources have proved vital in determining consumer traits and consumer location choice in an organisation's bid to personalise consumer service.

3.4.4 Search engines.

Search engines such as Google Trends (GT) are a constant source of regular and updated data due to continuous consumer queries on particular words or text, with queries and history of searches existing as far back to January 2004. It captures how the demand of information under certain topics varies over time, providing useful data to detect emerging trends and underlying interests and concerns of society. The use of search engines such as google trends data to present consumer behavior patterns is presented by Choi and Varian (2009), who showed that some search categories in the Google search engine helped to predict car and home sales, incoming tourists or unemployment claims. Studies detailing

the use of search engines to predict consumer behaviour exist in various fields such as; improve forecasts of tourist inflows (Artola, Pinto and de Pedraza García 2015; Bangwayo-Skeete and Skeete, 2015) ; of private purchases of different goods and services (Vosen and Schmidt, 2011); and or of cinema admissions (Hand and Judge, 2012).

3.5 Types of Analytics Software/Tools

Data analysis is used in different domains like science, business, and social science, with a variety of tools existing that use many types of analysis techniques to store, manipulate and find meaningful inference from provided data sets (Blazquez & Domenech 2018). These data analysis tools help in deriving accurate results with minimum efforts and some can be right from a beginner to an expert who may or may not be from a technical background. Since analysis algorithms requires interpretation of the data, Gandomi & Haider (2015), present that there is a constant effort to develop tools which make analysing data sets, visualization and presentation of data easy and accurate.

Table 3.1 below presents some Software/tools utilised by marketers.

Table 3. 1: Types of Analytic Software/Tools

SOFTWARE/TOOLS	FUNCTION	LIMITATION
Data Wrangler	Wrangler is an interactive tool for data cleaning and transformation. It is designed to quicken the process of data manipulation, and reduce time spent on transforming data into actionable information by converting messy, real world data into the data tables.	A major drawback is that not all suggestions provided in data transformation is useful. Additionally, being a web-based service means that data is saved to an external site rendering it an ineffective option in processing sensitive internal information.
The R Project:	R is an unrestricted software environment for statistical computing and graphics. It is a general statistical analysis platform that runs on the command line. R can find means, medians, standard deviations, correlations and much more, including linear and generalized linear models, nonlinear regression models, time series analysis, classical parametric and nonparametric tests, clustering and smoothing. R also graphs, charts and plots results. There are numerous add-ons to this open-source project that significantly extend functionality. There is excellent functionality in R, including several visualization options as well as numerical and spatial analysis.	A major drawback of this analytical tool is the fact that R runs on the command line, meaning that users will have to painstakingly learn each command and what the commands do. As such, not all users will be comfortable with a text-only interface. Those dealing with large data sets may hit a memory barrier with the various commands.
Time Flow	This software is used in analysing time attribute in data. TimeFlow can generate visual timelines from text files, with entries color- and size-coded for easy pattern spotting. It also allows the information to be sorted and filtered, providing some statistical summaries of the data. TimeFlow makes it incredibly easy to interact with data in various ways, such as switching views or filtering by criteria such as date ranges or earthquakes of magnitude 8 or more. While many applications can plot bar graphs, fewer also offer calendar views. TimeFlow is a desktop application that makes it	There are no facilities for publishing or sharing results other than taking a screen snapshot, and additional development appears unlikely soon.

	quick and painless to edit individual entries.	
NodeXL	NodeXL is a visualization and analysis software of networks and relationships. It uses a technology referring to the discipline of finding connections between people based on various data sets. It is important to realise that it is an Excel plug-in which displays network graphs from a given list of connections, helping you analyse and see patterns and relationships in the data. It is "optimized for analysing online social media -- it includes built-in connections to query the APIs of Twitter, Flickr and YouTube, allowing you to draw networks of users and their activity. It also handles e-mail and conventional network analysis files.	
Tableau	Tableau is an extremely important Data visualization tool, which permits the organisation and presentation of information intuitively. It is exceptionally powerful in business because it communicates insights through data visualization. This tool can turn data into any number of visualizations, from simple to complex. You can drag and drop fields onto the work area and ask the software to suggest a visualization type, then customize everything from labels and tool tips to size, interactive filters and legend display. Tableau Public offers a variety of ways to display interactive data, by combining multiple connected visualizations onto a single dashboard, where one search filter can act on numerous charts, graphs and maps; underlying data tables can also be joined. Its drag-and-drop interface is also significantly quicker than	When using the free version of this software, visualization and data must reside on Tableau's site. As such, saved work is always sent to a public website, meaning work in progress can’t be saved without running the risk that it will be seen before it's ready. Once saved, viewers are also invited to download your entire workbook with data. All that functionality comes at a cost: Even with the drag-and drop interface, it'll take more than an hour or two to learn how to use the software's true capabilities, although you can get up and running doing simple charts and maps before too long.

	manually coding in JavaScript or R for most users.	
CSV Kit	CSVKit contains tools for importing, analyzing and reformatting comma-separated data files. CSVKit makes it quick and easy to preview, slice and summarize your files in order to examine them In addition to inputting CSV files, it can import several fixed-width file formats Additionally, two simple commands will generate a data structure that can, in turn, be used by several SQL database formats. The SQL code will create a table, inferring the proper data type for each field as well as the insert commands for adding data to the table.	Works on a command line and requires users learn new text commands which might not be worthwhile unless you work with CSV files often. Additionally, this tool suite is written in Python, so users need Python installed on their systems as well.

Source: Mujawar and Joshi (2015)

3.6 Empirical Review

Boateng, Hinson, Heeks and Molla, (2008), present that an empirical review is vital in research, highlighting key differences between existing knowledge and what needs to be known. This enables the identification of key knowledge gaps, thereby informing other studies of vital contributions to be made (Melville Kraemer and Gurbaxani 2004; Webster and Watson, 2002). Boateng et al. (2008) posit that an empirical review process involves gathering, assimilation, and examination of existing literature from various sources, mainly preoccupied with academic ones. However, the study was not limited to peer-reviewed academic journals only, with conference papers, thesis and book chapters all utilised.

3.6.1 Research Topics and Major Results

The major themes identified in the selected articles are on big data adoption and benefits, and the performance implications and outcomes of analytics usage in marketing. Key findings are summarised and presented below

- **Big Data Technology Adoption and Benefits**

Various studies on Big Data have highlighted its growing importance (Raguseo, 2018; Sharda, Delen and Turban, 2015) and how its combination with analytics is influencing various decisions in in the business a landscape (Hazen, Boone, Ezell and Jones-Farmer, 2014; Grigsby, 2015)

In a study by Ragueseo (2018), the researcher sought to investigates the adoption levels of big data technologies in companies, and the big data sources and frequently recognized strategic, transactional, transformational and informational benefits and risks related to the usage of big data technologies by companies. With a sample of 200 Chief Information Officers from 170 organisations, the study revealed that the adoption level of big data technologies and analytics involved the use of visual analytics technologies, scripting languages, and in-memory analytics software, with big data sources most often utilised are online portal contents, POS data and smart meter data. Additionally, organisations are more likely to utilise big data that are proprietary than to buy other data on customers from third parties. The most frequent benefits of big data technologies include improved enable employee productivity to be enhanced to a greater extent, the production of better products and services and the expansion of the organisation's capabilities.

Quite similarly, Blazquez & Domenech (2017) study, "Big Data sources and methods for social and economic analyses", aims at developing a Big Data architecture, with the aim of properly integrating various information sources and analytics in predicting and determining consumer social and economic behaviour and trends. Wamba et al., (2015) study on "Big data analytics and firm performance: Effects of dynamic capabilities", utilising a sample size of 297 Chinese IT managers and business analysts with big data and business analytic

experience present that Big data Analytics Capability has a strong impact on firm performance.

Additional studies by Germann, Lilien, Fiedler, & Kraus (2014), "Do retailers benefit from deploying customer analytics?" and Brands (2014) "Big data and business intelligence for management accountants present that aside from being a source of competitive advantage for organisations Big Data is enabling improved business efficiency and effectiveness due to its high operational and strategic potential, by allowing firms to analyse and manage strategy through a data lens. Indeed, BDA is increasingly becoming a crucial component of decision-making processes in businesses (Hagel, 2015). Different studies produce different results in relation to the effect of Big Data Technologies on organisation's performance albeit most purport positive findings. It seems that the different underlining theoretical procedures the authors use for their studies affects the outcomes of the studies. In addition, there is no validated scale in existence for measuring Big Data Technologies adoption and Firm performance

- **Performance Implications of Deploying Marketing Analytics**

The impact of big data has resulted in the need for various processes in analysing and making meaningful use of such information. Key to the utilisation of such data for marketing decisions is the utilisation of marketing analytics. Research by Germann Lilien and Rangaswamy (2012), examined the performance implications of deploying analytics by surveying 212 senior executives of Fortune 1000 firms in order to reveal how these firms can achieve positive and apparently sustainable performance outcomes through greater use of marketing analytics. From the analysis of the study, it was revealed that vital moderators such as intense industry competition and increasingly varying consumer preferences increase the positive impact of the deployment of marketing analytics on firm performance.

Additionally, findings from the study reveal that top management support, a strong analytics culture and a strong IT support and analytics skills are important for the effective deployment of marketing analytics. A study by Ling-yee (2010) examined 209 business firms and confirmed that CRM performance can be enhanced by applying marketing metrics leading to an overall positive firm performance. Appelbaum, Kogan, Vasarhelyi and Yan (2017), additionally show the need for analytics use in accounting by proposing a Managerial Accounting Data Analytics (MADA) framework based on the balanced scorecard theory in a business intelligence context in order to utilise comprehensive business analytics to conduct performance measurement and provide decision related information.

3.7 Underlying Theory

Beynon- Davies (1999); Heeks (2002); Littlejohns, Wyatt and Garvician (2003), all argue that more than 40% of information technology (IT) developments in various sectors have failed or been abandoned with a foremost reason for such failure being the insufficient knowledge and understanding of sociotechnical aspects of IT, particularly the understanding of how people and organisations adopt information technology (Aarts and Gorman, 2007; Giuse, and Kuhn, 2003). The use of big data driven analytics represents an evolving technology by which firms can continually improve on their business/marketing decisions, thus presenting unique opportunities and challenges for businesses globally and even particularly Africa. As such, there is greater need for firms to understand it in order to facilitate a greater understanding in its application.

Theories on adoption of technology have been widely researched in the last few decades among researchers (Anderson and Schwager 2014; Vankatesh, Morris, Davis and Davis, 2003), with the continuing quest to ensure user acceptance of technology now an ongoing management challenge (Schwarz and Chin, 2007). As such, research on individual

acceptance and use of information technology (IT) being one of the most established and mature streams of information systems (IS) research (Venkatesh, Davis, & Morris, 2007).

This substantial level of study on IS/IT has witnessed the use of a wide range of exploratory techniques examining many different systems and technologies in countless different contexts. Williams, Dwivedi, Lai and Schwarz, 2009), with research on various research on technology adoption by groups and organisations existing throughout literature (Sarker and Valacich, 2010; Sarker, Valacich, and Sarker, 2005). Some of the known theories that examine the behavior of individual adoption of technology include the theory of reasoned action (TRA), theory acceptance model (TAM), Theory of planned behavior (TPB) and Innovation of Diffusion

Research studies have addressed information technology impact from a variety of perspectives including: new ventures (Fairlie 2006), business performance (Brynjolfsson & Hitt 2000), competitive advantage (Sethi & King 1994), organisational strategy (Mahmood 1991), time management (Sulek & Marucheck 1991), and industry level (Segars & Grover 1994). Increasingly, the relevant question about information technology impact relates to the nature of that impact and how it occurs. Impact through use is one area of investigation suggested (Torkazdeh & Doll 1999). Although it is quite obvious system use would lead to impact, the unanswered question is how.

Wilkin (2007), posits that the cost to business for ineffectual information system is significant, not only in economic terms, but also in terms of job performance and job satisfaction. As such, it is vital that organisations implement information systems which are beneficial and positively impact on their business processes.

According to Torkzadeh and Doll (1999), in general, the impact of technology can be viewed from the system of the value chain perspective, which is based on the attitude–

behaviour theory. Impact is the most important variable in the chain of a system to value construct as it has a direct consequence on usage, which, subsequently, determines the organisational impact. Based on the system to value chain and downstream research concept, this study investigates the various purposes for which organisations use of marketing analytics and also identifies its impact on organisational performance.

CHAPTER FOUR

RESEARCH METHODOLOGY

4.0 Introduction

The chapter presents a discussion of the study's methodology, beginning with the research paradigm of choice, and justifications for the choice of a qualitative approach to the study. Also discussed are the study's sampling techniques, ethical considerations, and the study's limitations.

4.1 Research paradigm

Burrell and Morgan (1979), assert that researchers are consciously or unconsciously influenced in making certain assumptions in their research, which inevitably shapes the understanding of research questions, methods and the interpretation of findings (Crotty 1998). This makes the understanding of philosophical assumptions or paradigms research is grounded in vital because it informs and guides the research process. Denzin & Lincoln (2011), posit that philosophical assumptions have been articulated throughout the years in literature.

Creswell (2013) describes philosophical assumptions as 'abstract ideas and beliefs that inform the research process', with the adherence to one paradigm predetermining the direction of theory development for a discipline, ultimately demarcating knowledge available for utilization in practice. These beliefs or assumptions have been referred to as paradigms (Lincoln, Lynham and Guba, 2011; Mertens, 2010). They include; epistemological assumptions (assumptions about human knowledge), ontological assumptions (realities encountered in research) and axiological assumptions (the extent and ways a researcher's values influence the research process).

Creswell (2013) argues the ontological philosophical assumption is concerned with the nature of reality, while the epistemological assumption is concerned with what knowledge is, how it is acquired, what qualifies as knowledge and how we can communicate knowledge to others (Burrell and Morgan 1979; Frankfort-Nachmias & Nachmias, 1996). The axiological assumption, meanwhile, is concerned with the researcher's values and the role these values play in the research. An example being; researchers, ontologically, might be guided by the notion of the existence of a single reality, while others might believe in the existence of multiple realities.

Whereas ontology may initially seem rather abstract, the relevance of epistemology is more obvious. The multidisciplinary of various fields in academia means that different types of knowledge – ranging from numerical data to textual and visual data, from facts to interpretations, and including narratives, stories and even fictional accounts – can all be considered legitimate. Consequently, researchers adopt different epistemologies in their research, including projects based on archival research and autobiographical accounts (Martí and Fernández, 2013), narratives (Gabriel et al. 2013) and fictional literature (De Cock and Land, 2006). This variety of acceptable epistemologies gives you a much greater choice of methods than you would have in many other academic disciplines.

Another philosophical assumption; The methodological assumption, is concerned with the logic adopted in the research process (Creswell, 2013). Here, researchers may adopt deductive reasoning, that is formulating and testing hypothesis; or inductive reasoning, which is building theory based on data (Clover & Balsey, 1984; Babbie, 1990; Alvesson & Kärreman, 2011).

(Lincoln, Lynham, & Guba, 2011; Mertens, 2010; Cresswell (2013) posits that these philosophical assumptions exist in research paradigms which he explains as a "basic set of

beliefs that guide action". Kikuchi (2003) similarly equates paradigm with an individual's perceived 'worldview'. Encyclopedia of Qualitative Research (2008) defines a paradigm as a set of assumptions and perceptual orientations shared by members of a research community. Paradigms determine how members of research communities view both the phenomena their community studies and the research methodology that should be employed to study those phenomena. According to Denzin and Lincoln (2005) paradigm is the net that contains the researcher's epistemological, ontological, and methodological premises.

Cheek (2000) explains that paradigms are lenses for viewing and interpreting significant substantive issues to the discipline with issues deemed worthy of pursuit, with those deemed worthy of pursuit prioritized and the others marginalized. Similarly, Collins and Hussey (2003) postulate that a research paradigm defines the range of possible relationships in a researcher's world, which consequently affects the entire process of their research, as such, (Moccia, 1988; Guba 1990) agree that paradigms can be neither proved nor disproved. According to Kuhn (1970), all disciplinary research is conducted within paradigms. These paradigms, identified in literature by various scholars include; in social science research are positivism, interpretivism, realism, relativism and critical realism (Chan, 2015; Kim, 2003; Orlikowski & Baroudi, 1991).

This research adopts an Interpretivist approach in seeking to understand reality (Cresswell, 2013) and not measure it. This approach is justified because the study sought to understand how marketing analytics is applied and for what purposes is it utilised for. Additionally, due to the somewhat novel nature of the study in relation to the context, the interpretivist approach is justified for this study.

Researchers believe that the interpretivist/constructivist paradigm predominantly uses qualitative methods (Glesne and Peshkin, 1992; Silverman, 2000; McQueen, 2002; Thomas,

2003; Willis, 2007; Nind &Todd, 2011 and Willis (2007), asserting further that "interpretivists tend to favour qualitative methods such as case studies and ethnography". As explained by Willis (2007), qualitative approaches often give rich reports that are necessary for interpretivists to fully understand contexts. Thomas (2003) maintains that qualitative methods are usually supported by interpretivists, because the interpretive paradigm "portrays a world in which reality is socially constructed, complex, and continually changing"

Table 4.1: Research Paradigms

ONTOLOGY (What is the nature of reality?)	**EPISTEMOLOGY (What is the nature of knowledge generated?)**	**METHODOLOGY (How is knowledge created)**
POSITIVISM		
There is a single, objective and tangible reality.	Value- Free. Knowledge created is objective, free of time impacts, and is context-free.	Researchers formulate research questions and hypotheses and then test them empirically under carefully controlled circumstances. Deductive reasoning
INTERPRETIVIST		
Multiple realities exist, subject to human experiences and interpretation. Reality is socially constructed.	Value-Laden. Knowledge generated is subjective, time-bound and context dependent.	Knowledge is made through researchers recognising the different interpretations and constructions of reality that exist, and endeavouring to establish patterns. Inductive logic and emergent design.
REALISM		
Reality is “real” yet just incompletely and probabilistically understandable, so triangulation from numerous sources is required to attempt to know it.	Value-Cognizant/Value aware. Findings are probably true……researcher needs to triangulate any perceptions collected.	Social phenomenon is understood through hypotheses which are tested to establish patterns of associations and hence, the most possible explanation. Hypothetico Deduction
RELATIVISM		
Multiple realities exist. Reality as truth is not "absolute", it is relative, it is dependent upon 'something' and it does exist.	The interpretation of the world requires some form of human processing	The construction of knowledge is influenced by the worldview and research paradigm of a researcher. Researchers should focus more on creating and developing new 'useful' theories - useful solutions to specific problems.
CRITICAL REALISM		
Two worlds - transitive and intransitive. Transitive is what we observe and learn with our mind - the perceptions of reality. Intransitive embodies the reality which is independent of what the mind thinks.	Transitive world is value-laden and changing continually. Intransitive world has underlying structures and mechanisms that are 'relatively enduring' - that is what we want to study.	Researchers seek to deconstruct and understand that structures and mechanisms underlying the subjective realities that exist. Triangulation from many sources is required to try to know it. Retroductive reasoning.

Source: Boateng (2014)

4.2 Research Design

Burns & Grove (2003) define a research design as "a blueprint for conducting a study with maximum control over factors that may interfere with the validity of the findings". Reddy & Acharyulu, (2008), additionally explain a research design specifies the procedures by which needed information is acquired in order to proffer solutions to existing research problems. As such, the research design guides the researcher on what information and the method which is relevant to the achievement of his/her aim by linking together data to be collected and conclusions to be drawn to the initial questions of a study basically ensuring coherence. As such, there exist no single accurate research design but it must be tailored in order to achieve the aims of the study, with Smith & Gerald (2010), extrapolating that "A good research design ensures that the information obtained is relevant to the research problem, and that it is collected by objective and economical procedures."

The research design may be qualitative and/or quantitative. Creswell (1998), posits that "qualitative research is an inquiry process of understanding based on distinct methodological traditions of inquiry that explore a social or human problem". It involves the researcher seeking and analysing detailed information and views from respondents in a natural setting. On the contrary, a quantitative research design, in contrast, adopts a positivist philosophy of knowing the emphasised objectivity by using numbers, statistics and experimental control to quantify phenomena (McMillan and Schumacher, 1993). Qualitative researchers study things in their natural settings and attempt to make a sense of what people bring to them (Denzin & Lincoln, 2005). In line with Gephart (1999) and Creswell (2013), the use of a qualitative study was suitable for this study due to the investigative nature by which the researcher seeks to understand how marketing analytics is utilised in certain organisations in Ghana. Gephart (1999) additionally argues that qualitative approach points to the use of qualitative data-gathering methods, which suggest

that the data are generated mainly through interactions like conversations and interviews. The qualitative approach helped the researcher to gather data on issues such as the use of marketing analytics and possible benefits form it.

The qualitative research approach employed in this study is a case study, which is described as an in-depth investigation of a single individual, group, or event, to explore causation, in order to find underlying principles (Miles et al, 2014). Baxter and Jack (2008) expatiate that when a study is used to predict similar results, it subscribes to a literal application of the case study approach; while a theoretical replication refers to when the study is used to predict 'contrasting results but for predictable reasons.

Yin (1994) proposes that a case study is the most appropriate method when the research addresses a descriptive question (what), or an explanatory question (why or how). This study is exploratory in nature, hence a case study application in this study aids the literal or theoretical replication of theory or explanation-focused research. This research tries to examine how intangibles are reported using interviews with informants by studying four organisations to understand and explore the application of marketing analytics in Ghanaian organisations. This approach is also justifiable as the study benefits from multiple sources of data, and from Yin (1994) good studies are the ones that benefits from multiple sources of evidence.

Saunders and Lewis (2012) present that the goal of all researches is grouped into; "exploratory research (which seeks new insights and clarify the understanding of a problem), descriptive research (which describes phenomena that exist and to obtain information on attributes of a problem), or explanatory research (which aims to understand the phenomena by establishing causal relationships between the variables)". This study adopted an exploratory research approach which Boateng (2014) identifies as dealing with

an area where little is known, or little research has been done. He further asserted that qualitative research explores 'the meanings, attitudes, values, and beliefs people associate with a phenomenon in order to establish a better understanding'. The qualitative approach, it is argued, takes a wider interest in the level of meaning. It seeks to provide space for research subjects to express their opinions through their own words, with respect to what they are thinking, feeling, their values, experiences and observations to so the researcher can access them (Alvesson & Kärreman, 2011).

4.3 Sampling Technique and Sample Size

Babbie (1990) presents that sampling is utilised in scientific inquiry as it is often 'impossible, impractical, or extremely expensive' to obtain data from the survey population in its entireness. There exist two major sampling designs; Probability which is more suited for quantitative studies, and Non-probability, which is more suited for qualitative studies (Babbie, 1990; Singleton & Straits, 2010; Babbie, 2013). There are three main sampling techniques existing under the non-probability design; Convenience, Quota, and Purposive techniques. Convenience (also referred to as accidental, haphazard, and unplanned) sampling, the researcher samples units that are conveniently available (Babbie, 1990; Singleton & Straits, 2010). Though this technique saves money, effort and time, it in turn sacrifices credibility, representativeness, and information (Singleton & Straits, 2010; Creswell, 2013).

In selecting the sample, the purposive sample technique was utilised with the goal being 'to obtain cases deemed information-rich for the purposes of the study' (Sandelowski, 2000). Malterud, (2001) presents that purposive sampling is commonly used in acquiring qualitative data with Silverman (2010) further arguing that researchers seek out cases where the phenomenon under study is likely to occur. Creswell (2013) further distinguishes

between two types of purposeful sampling: the random purposeful which was employed when sampling the customers of the three firms; and stratified purposeful, which 'illustrates subgroups and facilitates comparisons.

Concerns about data saturation have been as a result of what constitutes an appropriate sample size. Data saturation as defined by Fusch and Ness (2015), is 'when there is enough information to replicate the study when the ability to obtain additional new information has been attained, and when further coding is no longer feasible'. They maintain that there is no one ideal sample size for all qualitative research, while other researchers suggest different sizes per type of study. For instance, Guest et al. (2006) suggest six interviews while Creswell (1998) suggests that for phenomenological studies, between five and twenty-five may be appropriate, and for grounded studies, any number between twenty and thirty interviews may be appropriate.

Grounding his suggestions in research objectives, Kuzel (1992) argues that between eleven and twenty-one interviews are ideal when pursuing disconfirming evidence, and between five and nine data sources for a homogenous sample. Furthermore, to enhance validity, Crouch and McKenzie (2006) suggest data sources numbering less than twenty. Despite the lack of consensus on an ideal sample size, data saturation remains important as too much of it can lead to information overload, and too little of it can impact the validity of the study's results.

Four organisations were selected for the study; MTN, Jumia, AirtelTigo and Ringiers GH LTD because they had checked all the case boundaries related to the study. Sample size was guided by Creswell's (2013) observations that a general guiding principle in qualitative studies is to study few cases extensively, as the goal is not to generalize but to enlighten

served as a leading factor in the sample size. He further suggests that not more than 4 or 5 data sources in a case study to enable analyses of themes across cases.

4.4 Data Sources

Data for the study came from two sources; primary and secondary. The former comprised data collected from interviews with the marketing managers and IT managers in the various organisations with the aid of aptly designed interview guides, while the latter comprised such data as audiovisual data and text-based digital material such as electronic newsletters and social media content. Application of varied data sources are reinforced by the case study approach (Creswell, 2013; Boateng, 2014). Data acquired from the various sources aided in a holistic understanding of the phenomenon under study, helping to attain while enhancing credibility of the data in research.

4.5 Data Analysis

Data Analysis is presented in this study as the process of systematically applying statistical and/or logical techniques to describe and illustrate, condense and recap, and evaluate data (Sharma, 2018). According to several scholars (Hsieh & Shannon, 2005; Saldaña, 2009; Babbie, 2013; Creswell, 2013), researchers also have access to other vast array of techniques with which to analyse data according to the type of qualitative study.

Thorne (2000) characterized data analysis as the most complex phase of qualitative research, and one that receives the least thoughtful discussion in the literature. Data analysis conducted in a systematic approach can be transparently communicated to others (Malterud, 2001; Sandelowski, 1995). In conducting data analysis, the researcher becomes the instrument for analysis, making judgments about coding, theming, decontextualizing, and recontextualizing the data (Starks & Trinidad, 2007). Each qualitative research approach has specific techniques for conducting, documenting, and evaluating data analysis

processes, but it is the individual researcher's responsibility to assure rigor and trustworthiness. Qualitative researchers can demonstrate how data analysis has been conducted through recording, systematizing, and disclosing the methods of analysis with enough detail to enable the reader to determine whether the process is credible (Attride-Stirling, 2001; Coˆt´e & Turgeon, 2005; Ryan, Coughlan, & Cronin, 2007).

The data analysis approaches applied in this study and the justification for the application of these approaches is what this section takes into consideration. Among the diverse approaches used for qualitative data analysis are pattern matching, template analysis, content analysis, analytic induction and thematic analysis. This work however restricts itself to thematic approach to data analysis with the case study approach additionally supporting thematic analysis.

4.6 Thematic Analysis

Data was analysed thematically in order to identify common themes regarding the dimensions, nature and key characteristics of marketing analytics and its subsequent effect upon implementation. Saldaña (2009) argues that a theme 'is a phrase or sentence that identifies what a unit of data means. Evidently, a theme describes or explains covert observations of a phenomenon with themes often recurring concepts extracted from data which help shape data by various categories. Saldaña, (2009) presents that the themes 'and their related data serve as illustrative examples to support the interpretations with Alhojailan, (2012) explaining that themes develop clues and then adapt or connect them to the raw data as summary indicators for deferred analysis.

Thematic analysis is described as a method for identifying, analysing, and reporting patterns (themes) within data (Braun & Clarke, 2006) because it interprets various aspects of the research topic (Boyatzis, 1998). Saldaña (2009), additionally adds that thematic analysis

involves two cycles; themes are stated in the first cycle for meaning condensation, and then spun together in the second cycle for meaning interpretation, which explains why the phenomenon occurs or what it means. Data is thus analysed thematically based on themes extracted from and informed by literature. According to (Braun and Clarke, 2006), thematic analysis is a useful and flexible method for qualitative research. Alhojailan (2012) asserts that this makes the process of thematic analysis more appropriate for analyzing the data when the research's aim is to extract information to determine the relationship between variables and to compare different sets of evidence that pertain to different situations in same study.

Hence, the interpretive nature of this study in relation to its philosophical assumption where the researchers often relate their claims to existing literature (Braun & Clarke, 2006) and the qualitative nature of this research where the case study approach is used make the thematic analysis applied in this study appropriate. This research uses interview data from interviews and growth figures to discover themes about nature of marketing analytics amongst multinational organisations.

4.7 Ethical Consideration

This section of the chapter discusses the ethical issues that the researchers need to take note of and how the researchers in their work upheld those considerations. Emphasis on tenets such as honesty, thoroughness, objectivity, and relevance were taken into consideration and that all empirical evidence presented in the subsequent chapters were analysed from the interview and growth figures of the chosen companies.

Ethics is presented by Holosko and Thyer (2011) as 1. Standards of conduct (or behavior) that distinguish between right/wrong, good/bad and 2. The study of standards of conduct. Additionally, Walton (2008) further elaborated on research ethics by maintaining that it

rightly provides guidelines for the responsible conduct of research educating and monitoring researchers to ensure a high ethical standard with key ethical principles of respect, justice and beneficence underpinning the ethical requirements of informed consent, participant selection and risk analysis (Emanuel & Grady, 2006).

Research ethics specifically involves the analysis of ethical issues that are raised when people are involved as participants in research. A letter of introduction, which was authorized by the primary supervisor of the research was sent in advance to selected firms for the research. All firms used for the research were purposively sampled with the researcher having no personal interest in the selected organisations, in order to adhere to the principle of objectivity. The letters presented to the firms informed the organisation of the purpose of study. The identification and interaction with gatekeepers in the firms was to facilitate interviews with the respondents with a write-up of the scope of work and an interview guide presented to these gatekeepers to be given to respondents. The scope of work comprised an introduction to big data and marketing analytics, the nature of marketing analytics application in industries and the possible benefits derived from the the implication of marketing analytics, Follow-up visits were made to the interview sites and phone calls were also made to the gatekeepers till interview dates were scheduled. All these procedures were carried out to ensure Creswell (2013), and Babbie's (2013) assertions on the need for voluntary participation/informed consent and further complying with professional guidance that recommends no untoward pressure or coercion is applied to potential participants when making choices (RCN 2004).

The researcher in collecting data employed a conversational/collaborative method for personal interviews in collecting data. This helped the researcher refrain from only asking questions but giving ear to questions related to the study which were posed by respondents. This is essential because Creswell (2013), reasons that personal interview raises such issues

as the perception of power and trust which could threaten the outcome of interview, thus a conversational/collaborative approach dispels power imbalance inherent in qualitative interviews that inhibit respondents, especially introverted ones, from fully expressing themselves. This method had its challenges such as extremely personal questions asked of the researcher could have potentially derailed the interview.

By adopting this approach, individuals interviewed can freely discuss issues a little bit distant from the subject matter they are queried on, requiring additional focus from the researcher in selecting relevant subject matter in transcription.

CHAPTER FIVE

DATA ANALYSIS AND DISCUSSION

5.0 Introduction

This chapter is comprised of two main sections. The first section consists of a presentation of the data collected from respondents while the second section addresses the findings with existing literature. Responses from various respondents are categorized and discussed in order to address the research objectives raised in chapter one:

5.1 Data Analysis

This section of the study analyses the data in accordance with the research objectives.

5.1.1 Profile of Respondents

The profile of respondents presented in this study covers the sex, age, position in the organisation, number of years in the organisation and presents the organisation in which they work or operate.

Table 5.1: Profile of Respondents

RESPONDENT	CODE	POSITION IN ORGANISATION	YEARS IN ORGANISATION
A	EA	ASSISTANT HEAD OF MARKETING ANALYTICS (MAIN OFFICE)	SIX
B	EB	SENIOR SPECIALIST: ANALYTIC	FOUR
C	EC	COUNTRY DIRECTOR	FIVE
D	ED	HEAD OF ANALYTICS	SIX

Source: Field Data, 2019

Respondents of this study were all top to middle level managers in the various analytics departments and with some knowledge and skill regarding the use of analytics. In all organisations, employees in the analytics department had had to have good working knowledge in quite a number of analytics tools before they were even considered for employment. As such, most individual did not have to undergo re-orientation as to the various justified based on their in-depth knowledge with regards to the use of analytics in the various organisation selected for the study. Additionally, most of the individuals had been at the organisation for a minimum of 4 years. Also, findings from the study revealed that most employees in analytics across the organisations were most often males

Table 5. 2: Marketing Analytic Software/Tools

SOFTWARE/TOOL	FUNCTION
Supermetrics	connects data sources to Google Sheets
Report Garden	automates reporting from different data sources
Sprout Social	social media performance & listening
Facebook Audience Insights	understand & segment audiences for paid targeting
Google Search Console	track search performance
Moz	analyse search rankings
CrowdTangle	social media benchmarking
Excel	Performs various consumer data analyses

Source: Field Data, 2019

5.1.2 Objective One: To Explore The Purpose and Usage of Marketing Analytics in Multi-National Firms in Ghana.

The initial objective of this study was to explore the usage and purpose of marketing analytics in Ghana. Thus, the researcher sought to understand how analytics was utilised in marketing in the various organisations studied. To accomplish this aim, the researcher asked questions such as the types of analytic software or tools utilised by the organisation, purpose of analytics in the organisation and the reason behind the use of analytics. Additionally, the researcher asked on the nature of analytics in the organisation. Major themes to emerge from the respondents regarding the nature of analytics are discussed and presented along the major themes of: "*marketing analytics is still developing hence third-party assistance was often sought for some analytics", "analytics use in organisation's is not centred towards marketing but organisational performance", "marketing analytics is most often utilised for promotion".*

Marketing Analytics is still developing

From the analysis it was apparent that the organisations were at the evaluation or early implementation stage of the application and use of marketing analytics. It was also evident from the interviews that the organisation had embarked on a few analytics' usage and training initiatives in marketing in the past and was presently re-evaluating current assets with a view to presenting a clear strategy for the near future. Evidence from literature provides truth to the assertion that research and on the use of analytics, and even more specifically, marketing analytics is generally still developing in the African context with little studies in the field (Amado, Cortez, Rita & Moro, 2018). Also, general business use is somewhat now being developed in the African context. This was revealed through various inferences as to the nature of analytics.

For instance, EA indicated that

> *"the organisation has realised the strategic benefit of analytics and there are numerous plans to continue its steady development. Even though we have always known of the benefits associated with the use of analytics, "……. "now more than ever, we are well into various plans to increase our analytics capacity to incorporate various consumer data, such as geospatial data, which gives us far greater information when utilising analytics in making marketing decisions." Additionally, we are regularly and constantly training our various regional marketing teams on some analytic tools and the benefits of associated with it.*

Similarly, EB noted that

> *"……." now more than ever, we are focused on developing our analytics capabilities in marketing, procurement, with our finances and even our human resource".*

Due to the nature of analytics in these organisations, it was revealed that the use of analytics and its application in the organisations resulted in the engagement of third-party organisations which specialise in the use of analytical software to generate reports for marketing plans/campaigns.

A respondent from AT noted:

> "*I can say that 90% of analytics in the organisation in not primarily for marketing efforts. We regularly utilise organisations which have a track record of effectively analysing marketing activities and providing us with actionable information or insight".*

Additionally, due to the "developing nature" of marketing analytics, of all the organisations utilised for this study, only one had an established analytics wing within the marketing department, which was solely dedicated to the application of analytics software and tools for marketing related outputs/decisions. Evidently, this revealed that most organisations did not yet see the need for the establishment of an autonomous department within their

marketing departments dedicated to only analytics. However, one organisation utilised had a fully functioning marketing analytics team.

EA noted that

> "……*We have a fully functioning marketing analytics wing in the marketing department". This section of the marketing department has a Director, and we work with the marketing department and the general analytics team of the organisation".*

Contrary to this ED noted that:

> *"our marketing analytics is generally handled by a central team which oversees all matters related to analytics in the firm. We don't have a separate department for marketing analytics. This analytics team works with all other departments".*

EC also similarly noted that *"....*

> *"we don't have a separate team or department for analytics in marketing due, mainly due to the fact that we don't have the manpower or resources to do that".*

Aside the contextual differences resulting in the outsourcing of marketing analytics related processes, evidence in literature; Nasr, Eshgi and Ganguli (2005); Germann et al., (2013), reveals that to some degree, however, marketers have been lax or slow to thoroughly embrace the marketing analytics component of the research process. Aside the contextual differences, evidence also points to the fact that most managers are not entirely willing to adopt marketing analytics due to not being entirely convinced about the benefits and as such, are more willing to slowly introduce marketing analytics than complete and radical change.

Promotion constituted the main use of Marketing analytics

Promotion forms a vital aspect of the marketing mix. It is vital to organisations in selling value because the ability to carefully crafting well thought-out messages and utilise appropriate mediums in order to effectively reach consumer segments. With the onset of the various technological revolutions such as the internet and social media, the need for

appropriate promotion has become increasingly important. Additionally, the rapidly evolving nature of consumer markets means that organisations have to present precise messages consumer markets would want while looking to minimise the cost involved. In doing this, it is vital that these organisations have access to various consumer data and are thus able to better understand and predict the types of messages or stimuli consumers would readily respond to. Various authors such as Wedel and Kannan (2016); Jayaram, Manrai and Manrai (2015); and Xu, Frankwick and Ramirez (2015), have all made significant contributions regarding the key areas (Customer relation management, product design and consumer segmentation) where marketing analytics have been most often used. However, differences in geographical context might be responsible for the main use of analytics in promotions than other areas in Africa (Ghana).

The field data confirms that analytics in marketing was majorly utilised mostly in carrying out effective promotions. This was prevalent in all the organisations studied for the research. Analytics in promotion was similarly mentioned to be very effective and efficient

EB mentioned that:

> *"it is important for the execution of promotional campaigns and their progress helping us to effectively track our views and web content, social media content and know if our messages are well placed or understood."*

Another respondent, EC noted that:

> *"We are able to strategically position our ads in order to determine who has seen our ads, their reactions and perceptions to our ads and if they can effectively connect our brands to our ads."*

The above statements suggest that marketing analytics was predominantly utilised in promotion. This was important because organisations which utilised analytics in their promotional efforts attested to the benefits, they derived from it.

Additional findings revealed that marketing analytics was utilised for measuring business performance and not solely focused on marketing performance.

5.1.3 Objective 2: To Investigate the Factors that Influence Multi-National Firms to Use Marketing Analytics.

An organisation is influenced and affected by a number of factors. As such, an organisation involves various processes which integrate different type of activities to achieve organisational goals and objectives, to achieve these goals there must be competent management providing them all those factors to perform their job efficiently and effectively. Managing organisations involve a process of integrating and coordinating the efforts of men and material for the accomplishment of set objectives. The nature of an organisation determines various aspects of the organisations. Technological organisations have to continually stay in touch with rapid changing technological occurrences in the current environment. Additionally, large multi-national organisations have to effectively track and be aware of consumer changing dynamics in today's environment. Thus, the study discovered that the nature of an organisation and competitive advantage are the main factors affecting the organisation's

Nature of Organisation.

The nature of an organisation in influencing organisation's use of marketing analytics is in confirmation with Venter and Tustin (2009). In researching business analytics, they suggested that various factors such as business size, industry and decision-maker positions play a role in how organisations adopt marketing analytics. This was evident in data gathered from respondents.

Respondent EB purported that:

> *"considering the type of organisation we are, size of our organisation and our consumer base, it is vital we utilise analytics in our marketing efforts. I confidently can say that most of the reports on our consumers by the use of analytics would be impossible to generate if these analytic tools were not available due to the kind of services we offer and our consumer base. We cannot deal with this large consumer size and track demands and changing consumer needs without these tools."*

Additionally, EA further explained that

> *"Our whole organisation cannot be effectively run without the use of analytical tools. The same can be said for our marketing efforts. In order to effectively reach the desired customer base, be aware of various consumer needs and effectively design marketing efforts which can help us reach the large number of consumer markets we have, there is a need for analytics.*

Evidence in literature to support this claim is provided by Reed and DeFillippi (1990), who reported that an organisation's IT Infrastructures and analytical processes that enable firms to obtain, process, and share information in real time, and detect opportunities and threats in a timely manner represent an invaluable firm resource for large scale firms

Source of Competitive Advantage

Most firms compete with a number of rivals although the degree of rivalry varies considerably across industries. The level of competition that a firm faces also has many concomitant effects. The use of marketing analytics in order to gain competitive advantage is as a result of firms being in constant need to satisfy its customers satisfaction in order to operate successfully. Research is rife with academic and business literature on the need for practitioners to understand how, why, and when analytics applications can be a valuable resource for companies to gain competitive advantage (Abbasi, Sarker, & Chiang, 2016; Agarwal & Dhar, 2014; Corte Real, Oliveira, & Ruivo, 2014; LaValle et al., 2011).

Additionally, Barton 2012, confirms that firms that inject big data analytics in their business operations can surpass their peers by 5% in productivity and 6% in profitability. This is quite evident in finding from the study where respondents noted that

> *EA: "well you see as an industry leader; it is vital that we are constantly seeking means and ways of improving our customer experience. This is vital for maintaining our position as the leader. Also, with the recent collaboration and strength of our competitors, tracking and reporting accurately on key issues and progress of our services which directly affect our customers has become increasingly vital now more than ever".*
>
> *EB: "…….am sure u are well aware of the competitive nature of our industry, as such in-order to prevent customers from leaving you have to constantly even think ahead for them and find ways to make your services better than the enemy"*

ED presents that:

> *"In our industry, you realise that they is a continuous fight to catch up with the market leader, even with our merger and also fend of competition from our closest rivals. Thus, intimate knowledge of your customer is a necessity and this is only achieved by having good customer insights.*

Competitive advantage thus was a key factor in the use of marketing analytics. The fact that marketing analytics application provided competitive advantage is also key in showing how organisations are willing to evolve when the business market evolves. The finding is also consistent with the empirical investigation of German, et al (2016) and Kannan et al. (2009), who discovered that when implemented properly, the use of marketing analytics could be a source of a sustainable competitive advantage for a firm. Also, research by Sharma, Mithas, & Kankanhalli, (2014), presents that most European firms are investing heavily in big data analytics technologies because they have constantly realised that it gives them a competitive edge over their customers. Also, Porter (1996), presents as firms evolve, "staying ahead of rivals gets harder," partially because of the diffusion of best practices, facilitated, for

example, by inputs from strategy consultants. Competitors are quick to imitate successful management techniques, particularly if they promise superior methods of understanding and meeting customers' needs. Such imitation eventually raises the bar for everyone (e.g., Chen, Su, & Tsai, 2007). Hence the prevalence of the use of marketing analytics within an industry may attenuate their positive performance implications.

5.1.4 Objective 3: To Explore the Successes and Challenges of Using Marketing Analytics in Multi-National Firms.

Mentioned throughout out literature is the fact that there exist various challenges to the use of marketing analytics. The study revealed certain key successes and challenges associated with the use of analytics. Some of these successes with the use of marketing analytics includes the effective implementation of marketing campaigns and tracking of marketing performance. A firm's marketing performance is a key indicator of the success and profitability of almost every marketing campaign and initiative carried out by the organisation. Carrying out a marketing campaign or initiative require various processes and in today's consumer markets success in intiatives which would lead to profitability has become harder to achieve. However, the use of marketing analytics allowed ensure marketers were well equipped with valuable consumer insight when implementing key initiative. Cao, Duan, and Banna (2019), present how marketing analytics usage is helping organisations in accurately determining consumer needs and design products and marketing initiatives to satisfy that need. Also, in the context of marketing analytics, the firm is has the ability of engaging in market-based learning and further use the resulting insights to sense and seize opportunities, and to reconfigure the firm's resources and enhance its capabilities to attain sustained competitive advantage (Vorhies & Morgan, 2005) or superior performance (Morgan, 2012; Vorhies, Orr, & Bush, 2011). It is vital that organisations are well aware of every aspect of their marketing operations in order to effectively track such

performance. Marketing performance is not different. The organisation must be well aware of every detail of their marketing operations and be able to determine which works and what does not work.

Respondent EB reported that

> *"Basically, the use of these analytical tools has provided a more efficient way of delivering targets and reporting on progress of set targets. The use of tools to gather and provide reports has enables us to gather data and provide reports which can be easily interpreted". Even though we are still learning, I believe that companies that don't use these analytical tools lack in-dept knowledge into what is going on in their marketing operations and are unable to track targets or prepare good marketing plans"*

Challenges with the application of marketing analytics were related to the working with third-party organisations. Malaka and Brown, 2015; McCarthy & Bali, 2013, present that a reliance on vendors (third parties) or vendor reliance is an important consideration for analytics usage. This is because developing these analytic models requires highly trained statisticians, who are presently in short supply and might not be available due to various reasons and factors hereby impacting on the use of marketing analytics. As such, marketers are constantly trying to ensure organisations utilise analytics software/tools which can be easy to use and understand. Additionally, the knowledge of analytics application in marketing and how well top-level management are willing to implement and adopt it also affected the use of analytics in marketing.

Training and knowledge of analytics in marketing was highlighted by most interviewees. Analysis revealed a direct link between the shortage of skills and adequate training and knowledge. The use of marketing analytics within the organisation was possibly being hindered by the lack of appropriate training of staff. Some respondents noted that the

organisation had the correct knowledge in implementing and analysing results from data analytics due to a deeper understanding of the various software or tools utilised

EB indicated that

> *"the complexity comes through where you have got to understand and know which data (social media, e-mails, customer surveys) must be utilised and how to present the results accurately".*

Additionally, the way in which business prioritise the use and application of analytics in marketing revealed a lack of vigorous effort towards its development and use. Analytics in the business was more focused on how to increase profit and measure overall business performance.

5.1.5 Other Important finding

Social media was the most dominant source of data for marketing analytics

The study revealed that a large portion of consumer data which marketers or organisations utilise in analytics was generated on social media. This is no surprising considering the number of social media sites and their growing adoption and use. Facebook, Twitter, Instagram and Youtube were the most dominant social media platforms where consumer data was harvested.

EA reported

> *"We have various sources of acquiring consumer data... we are even now into something called geospatial data…. but the impact of social media has been tremendous because people post their feelings about our product online most often."*

Similarly, EB notes that

> *Even most of our tools are designed to feed and gather data of social media. Its like an endless pool of data on our consumers which we can use to our benefit"*

The above assertions speak volumes of the importance of social media as a source of consumer data for marketers. Research has constantly spoken about the numerous benefit if social media, of which the mass availability of consumer data on these social media sites is an added benefit.

Table 5.3 illustrates the summary of results and cross cases of themes that emerged from the study

Table 5. 3: Summary of the Cross-Case Analysis in Relation to the Objectives of the Study

Study Themes/Cases	EA	EB	EC	ED
Purpose and Use of Analytics				
Still Developing	*	*	*	*
Engaging third parties		*	*	*
Promotional Activities		*	*	*
Measuring marketing and Business Performance	*	*	*	*
Influencing Factors				
Nature of Organisation	*	*	*	*
Competitive Advantage	*	*	*	*
Success and Challenging Factors				
Effective Marketing Campaigns and Superior performance	*	*	*	*
Improved tracking marketing performance	*	*	*	*
Problems arising from third party organisations		*	*	*
Employee knowledge and skill	*	*	*	*
Prioritisation of analytics for marketing		*		*

Note

(*) means the variable of the theme has an impact on the case.

Source: Adapted from Blankson and Crawford (2012)

CHAPTER SIX

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

6.0 Introduction

The preceding chapter presented findings from the various interviews conducted as well as a discussion of those findings. This chapter provides a summary to the research study, major results, conclusions, and significance of the study. Grounded on conclusions derived from the findings presented by this research, recommendations (for policymakers, organisations and various stakeholders), along with various limitations and suggested future directions for this research topic are outlined.

6.1 Summary of the Study

Evidently, over the past half century, marketing literature has documented numerous benefits of the use of marketing analytics, with explorations of broader decision options (Sinha & Zoltners, 2001), and improved decision consistency (Natter, Mild, Wagner, & Taudes, 2008), being some of the most obvious benefits. However, despite the numerous benefits, varying contextual studies have resulted in the different factors affecting the use of analytics in marketing. As such, this research seeks to inform on the nature of marketing analytics and various factors affecting its use in an African and Sub-Saharan context.

Prior to the findings of this research, major themes related to the concept of marketing analytics such as the definition, growth, evolution and necessity of analytics, sources of data and some software/tools utilised in analytics are explored. Additionally, the concept of big data and underlying characteristics are also explored. An empirical review on the nature and use of analytics and big data and the underlying theory which studied the impact of technology from the system of the value chain perspective, the attitude–behaviour theory is

presented. The study also presented a breakdown of the organisations utilised in the study, presenting key sectors and key areas affecting the development of analytical capabilities in Ghana. After the literature review, a qualitative research method and a case study strategy were used and, consequently, an interview guide was developed to interview four key respondents from the various organisations selected; Mtn. Jumia, AirtelTigo, Ringiers. Discussions and interviews were recorded, and the data acquired was transcribed and later analysed thematically. The findings of this study were presented, and the discussions were made in light of extant literature and the objectives of the study.

6.2 Summary of Major Findings

6.2.1 To explore the purpose and usage of marketing analytics in multinational firms in Ghana.

The first objective was to explore the purpose and use of marketing analytics amongst multinational firms in Ghana. Revelations from the study are quite clear on the fact that the use of analytics in marketing decisions is still undergoing massive development in most organisations.

As such, a key discovery on the purpose and use of marketing analytics amongst Ghanaian firms was that it was mainly tailored to boost and support promotional campaigns. Of all the marketing mix elements, marketers of the organisations use analytics the most in enhancing the success of their promotional efforts than any other core marketing aspect of their business.

Also, analytics in most of the organisations was utilised in measuring general business performance and was not marketing focused. As such, investment in most of the organisations into the use of analytics, was not tailored to deal with marketing related issues

or to improve marketing performance but how the business can generally improve in key areas.

Most of the organisations save for one, didn't have a "stand-alone" marketing analytics department operating under the main marketing department of the organisations. Majority of marketing departments in the organisations relied on data gathered and utilised by the core analytics team of the organisation. As such, the data gathered was more on how to improve key business areas than centred towards a marketing approach.

Additionally, there existed the frequent use of third-party organisations which specialize in the utilization of analytical tools for data processing, interpretation and reporting insights in the organisations marketing consumer behaviour. The use of these organisations was often dependent on the nature of insight the organisation sought to acquire on their consumers.

6.2.2 To investigate the factors that influence multinational firms use of marketing analytics.

The second objective of the study was aimed at investigating various factors influencing the organisational use of marketing analytics. This objective was considered because it was quite evident that various factors which were affected the nature and use of analytics in making marketing information decisions.

The first factor discovered to influence the use of analytics in the organisation was the nature of the organisation. Findings from respondents revealed that the type of organisation was the major factor influencing the use of analytics. Technological organisations or organisations which are technological in nature were very progressive about the use of analytics in their activities, even if no entirely geared toward marketing. Since all of the organisations utilised in these studies were tech-based, they noted that they relied heavily on being progressive in tech culture hence analytics was just a vital part of their business.

Additionally, size of the organisation and the organisations changing consumer markets/segments also affected the organisation's use of marketing analytics. This is because the size of the organisation had an effect on the effective planning and segregation of marketing related activities hence analytics was used in order to properly divide, demarcate and implement marketing activities. Additionally, complex consumer demands in most of consumer markets now means understanding, studying and satisfying consumers' needs via conventional marketing research methods was seemingly impossible hence the need for analytics

Finally, the competitive nature of the business environment also resulted in the need for organisations to constantly stay ahead of fellow competitors by providing superior consumer needs. Analytics use, specifically in marketing was revealed to edge organisations ahead of their competitors because it revealed insights into consumer needs and gave them better chances of providing consumer-centered offerings.

6.2.3 To explore the successes and challenges of using marketing analytics.

The final objective of the research focused on finding out various success and challenges in the utilization of analytics, the research discovered that the use of analytics in marketing enabled firms to better track and monitor their marketing performance and activities. Due to the nature of marketing in most organisations, the research revealed that the implementation of analytics in marketing gave the organisations a detailed view of key areas in the marketing activities. As such, decisions to be taken were much more precise and effective.

Additionally, the use of analytics in marketing gave the organisation a greater understanding of their consumers, hence aiding the organisations towards the goal of being consumer centric.

Some challenges include the fact that working with third party organisations who carry out marketing analytics for the organisation can be frustrating. This can occur especially in times where key marketing decisions are to be made but there might be challenges in getting results from those organisations.

Additionally, the knowledge of analytics application in marketing and how well top-level management are willing to implement and adopt it also affected the use of analytics in marketing.

6.2.4 Other Notable Findings

The most dominant source of consumer data for marketing analytics was social media, which by far outpaced organisational websites/general websites or data from online surveys platforms. This was because social media served as a platform where users freely expressed opinions and thoughts on their needs, like, marketing campaigns or an organisation's service or product offerings.

The study revealed that, constantly evolving marketing analytics software required continuous training and education hence organisations must be willing to adequately train staff or hire well qualified staff to ensure that maximum results are generated from the use of these software/tools

As mentioned in the third objective, organisations and top-level managers are also vital in the implementation of analytics use in marketing. As such, organisations must be willing to adopt an analytical culture/readily embrace the use of analytics if they are to derive the best output from the use of analytics in marketing

6.3 Conclusions

The underlying conclusions were made based on findings of this study

- Marketing analytics or analytics use in marketing in Ghanaian organisations is still developing. Though there seem to be a knowledge of benefits associated with its usage, implementation across all marketing functions was still a major hurdle. This was characterized by the outsourcing of some analytics-related activities in marketing to third-party organisations

- In the Ghanaian context, the use of analytics in marketing was mainly for promotional efforts or effectively promotions. That is reaching out to consumers via various outlets

- Competitive business environment, sophisticated and changing consumer markets and the nature of the organisation are all various factors accounting for the continued need and demand for the use of analytics amongst organisations in Ghana.

- Effective marketing performance and a “360 degree” understanding of consumers are some of the success factors from the use of analytics in marketing while

Key findings from this research as presented above indicated that the various objectives the research sought to discover; the nature of marketing analytics in Ghana; factors influencing the use of analytics in marketing and; success and challenges from analytics use; have been achieved. The study can be concluded to have been fruitful in achieving its objectives. Nonetheless, based on the study findings, the research concludes that the contextual differences account for certain findings such as the dominance of marketing analytics use in promotional efforts.

6.4 Recommendations

Based on the findings and conclusions stated above, the study makes some recommendations to business organisation, policy makers and government bodies.

- It was evident that top level management in most organisations, were not totally given to the importance of creating and ensuring that analytic teams in marketing should exist separately while co-functioning with the core analytic team of the business used in measuring total organisations performance. As such, the study recommends that for effective performance or output with the use of marketing analytics, there should be a clear demarcation of a marketing analytics team from analytics teams for other functions of the business to give a clear goal and focus of the various targets and needs of consumers in implementing marketing campaigns.

- Secondly, the development of an "analytical" culture, that is the use of analytics in marketing must be promoted or enhanced. An analytical culture in this context refers to an environment or culture that supports the utilisation of analytics in business processes. to the This can be done through education, training and the implementation of various policies which enhance the use of analytics in arriving at key marketing decisions or core business decisions.

- Finally, policymakers, related governmental institutions as well as various stakeholders must work together to create an environment where technological challenges such as data integration, data privacy, access to data, internet and communication difficulties, data quality, cost and data integrity are all far and few. Additionally, from an organisational perspective, issues such as ownership and control of data, skills shortages, business focus, training and exposure, silos, and unclear processes need also to be addressed.

6.5 Suggestions for Future Research

Future research can build on this exploratory study by investigating in-depth one or more of the factors that influence the use of marketing analytics or key challenges, and how organisations resolve the challenges. By investigating a number of diverse organisations, the effect of varying contextual conditions on the nature of analytics in marketing can be elucidated. This study may employ a quantitative methodology to expand understanding from a quantitative perspective. Likewise, researchers could expand the scope of the study by including other geographical areas, especially within the same region.

REFERENCES

Abbasi, A., Sarker, S., & Chiang, R. H. (2016). Big data research in information systems: Toward an inclusive research agenda. *Journal of the Association for Information Systems*, *17*(2), I.

Abor, J., & Hinson, R. (2005). Internationalizing SME nontraditional exporters and their Internet use idiosyncrasies. Perspectives on Global Development and Technology, 4(2), 229-244.

Agarwal, R., & Dhar, V. (2014). Big data, data science, and analytics: The opportunity and challenge for IS research.

Agarwal, R., & Weill, P. (2012). The benefits of combining data with empathy. *MIT Sloan Management Review*, *54*(1), 35.

Agbim, K. C., & Idris, A. J. (2015). Competitive advantage through knowledge dissemination: An empirical analysis of hotels in Makurdi metropolis, Benue state, Nigeria. *European Journal of Business and Innovation Research, 3*(1), 22–35.

Alharthi, A., Krotov, V., & Bowman, M. (2017). Addressing barriers to big data. Business Horizons, 60(3), 285-292.

Ali, A., & Christofferson, K. (2011). *Internal Internationalization—A peek into the Black Box*. Gothenburg, Sweden: University of Gothenburg.

Amado, A., Cortez, P., Rita, P., & Moro, S. (2018). Research trends on Big Data in Marketing: A text mining and topic modeling based literature analysis. *European Research on Management and Business Economics*, *24*(1), 1-7.

Appelbaum, D., Kogan, A., Vasarhelyi, M.A., 2016. Analytics in External Auditing: A Literature Review. Working Paper Rutgers University CARLab, Newark, NJ, USA.

Arora, S.K., Li, Y., Youtie, J., Shapira, P. (2016). Using the Wayback Machine to mine websites in the social sciences: a methodological resource. *J. Assoc. Inf. Sci. Technol. 67* (8), 1904–1915. http://dx.doi.org/10.1002/asi.23503.

Arrigo, E., Liberati, C., Mariani, P. (2016). A multivariate approach to Facebook data for marketing communication. In: Proceedings of the 1st International Conference of Advanced Research Methods and Analytics (CARMA 2016). UPV Press, Universitat Politécnica de Valéncia, Valencia, Spain. http://dx.doi.org/10.4995/CARMA2016. 2016.2974.

Artola, C., Pinto, F., de Pedraza García, P. (2015). Can internet searches forecast tourism inflows*? Int. J. Manpow. 36* (1), 103–116. http://dx.doi.org/10.1108/IJM-12-2014-0259.

Askitas, N., & Zimmermann, K. F. (2015). The internet as a data source for advancement in social sciences. *International Journal of Manpower, 36*(1), 2-12.

Ayata, 2012. The Evolution of Big Data Analytics. http://ayata.com/the-Evolution-of-Big-Data-Analytics/.

Bangwayo-Skeete, P.F., Skeete, R.W., 2015. Can Google data improve the forecasting performance of tourist arrivals? Mixed-data sampling approach. Tour. *Manag. 46,* 454–464. http://dx.doi.org/10.1016/j.tourman.2014.07.014.

Bartels, Robert (1988), *The History of Marketing Thought. 3d edition*. Columbus: Publishing Horizons.

Barton, D., & Court, D. (2012). Making advanced analytics work for you. *Harvard business review*, *90*(10), 78-83.

Basu, A. (2013). Five pillars of prescriptive analytics success. *Anal. Mag*. 8–12

Bello-Orgaz, G., Jung, J. J., & Camacho, D. (2016). Social big data: Recent achievements and new challenges. *Information Fusion, 28*, 45-59.

Bertsimas, D., Kallus, N. (2014). From predictive to prescriptive analytics. ArXiv Preprint arXiv 1402, 5481

Biesdorf, S. (2013). Court, D., & Willmott, P.(2013). Big data: What's your plan. *McKinsey Quarterly*, *2*, 40-51.

Blankson, C., & Crawford, J. C. (2012). Impact of positioning strategies on service firm performance. *Journal of Business research, 65*(3), 311-316.

Blazquez, D., & Domenech, J. (2018). Big Data sources and methods for social and economic analyses. Technological Forecasting and Social Change, 130, 99-113.

Boateng, H. (2016). Customer knowledge management practices on a social media platform: A case study of MTN Ghana and Vodafone Ghana. *Information Development, 32*(3), 440-451.

Boateng, R., Heeks, R., Molla, A., & Hinson, R. (2008). E-commerce and socio-economic development: conceptualizing the link. *Internet Research, 18*(5), 562-594.

Boateng, Richard. "Research methods." (2012).

Bose, R. (2009). Advanced analytics: opportunities and challenges. *Industrial Management & Data Systems, 109*(2), 155-172.

Brady, M., Fellenz, M. R., & Brookes, R. (2008). Researching the role of information and communications technology (ICT) in contemporary marketing practices. *Journal of Business & Industrial Marketing, 23*(2), 108-114.

Bryant, R.E., Katz, R.H., Lazowska, E.D. (2008). Big-data computing: creating revolutionary breakthroughs in commerce, science, and society computing. Computing Research Initiatives for the 21st Century. Computing Research Association (Available at http://www.cra.org/ccc/files/docs/init/Big_Data.pdf).

Brynjolfsson, E., & McAfee, A. (2012). *Race against the machine: How the digital revolution is accelerating innovation, driving productivity, and irreversibly transforming employment and the economy*. Brynjolfsson and McAfee.

Cao, G., Duan, Y., & El Banna, A. (2019). A dynamic capability view of marketing analytics: Evidence from UK firms. *Industrial Marketing Management, 76*, 72-83.

Casher, Jonathan D. (1969), *Marketing and the Computer*. Boston: D.H. Mark Publications.

Chaffey, D., & Patron, M. (2012). From web analytics to digital marketing optimization: Increasing the commercial value of digital analytics. *Journal of Direct, Data and Digital Marketing Practice, 14*(1), 30-45.

Chahal, H., & Bakshi, P. (2015). Examining intellectual capital and competitive advantage relationship: Role of innovation and organizational learning. *International Journal of Bank Marketing*, *33*(3), 1–35.

Chaudhuri, S., Dayal, U., & Narasayya, V. (2011). An overview of business intelligence technology. *Communications of the ACM, 54*(8), 88-98.

Cheek J. (2000) Setting the parameters. In Postmodern and Poststructural Approaches to Nursing Research (Cheek J., ed.), Sage, Thousand Oaks, CA, USA, pp. 1–15.

Chen, C. P., & Zhang, C. Y. (2014). Data-intensive applications, challenges, techniques and technologies: A survey on Big Data. *Information sciences, 275*, 314-347.

Chen, H., Chiang, R. H. L., & Storey, V. C. (2012). Business intelligence and analytics: From big data to big impact. *MIS Quarterly*, *36*(4), 1165–1188.

Chen, M. J., Su, K. H., & Tsai, W. (2007). Competitive tension: The awareness-motivation-capability perspective. *Academy of management Journal, 50*(1), 101-118.

Chintagunta, P., Hanssens, D. M., & Hauser, J. R. (2016). Marketing and data science: Together the future is ours. *GfK Marketing Intelligence Review, 8*(2), 18-23.

Chiu, C. M., & Wang, E. T. (2008). Understanding Web-based learning continuance intention: The role of subjective task value. *Information & Management*, *45*(3), 194-201.

Choi, H., Varian, H., 2009b. Predicting the Present with Google Trends. http://static. googleusercontent.com/external_content/untrusted_dlcp/www.google.com/en// googleblogs/pdfs/google_predicting_the_present.pdf (accessed 10th October, 2016)

Chung, W. (2014). BizPro: Extracting and categorizing business intelligence factors from textual news articles. *International Journal of Information Management*, *34*(2), 272–284

Constantiou, I. D., & Kallinikos, J. (2015). New games, new rules: big data and the changing context of strategy. *Journal of Information Technology*, *30*(1), 44-57.

Coombs, R., Saviotti, P. and Walsh, V. (1987) Economics and Technological Change, Macmillan: London.

Côrte-Real, N., Oliveira, T., & Ruivo, P. (2017). Assessing business value of Big Data Analytics in European firms. *Journal of Business Research*, *70*, 379-390.

Cox, M., & Ellsworth, D. (1997, August). Managing big data for scientific visualization. In *ACM Siggraph* (Vol. 97, pp. 21-38).

Creswell, J. W. (1998). Qualitative inquiry and research design: Choosing among five designs. p1-15.

Creswell, J. W. (2009). Qualitative, Quantitative, and Mixed Method Approaches. Los Angeles: Sage Publications, Inc.

Creswell, J. W. (2013). Qualitative Inquiry & Research Design: Choosing Among Five Approaches (3rd ed.). Los Angeles, California: Sage Publication Inc.

Dasmani, L. (2015, July, 09). *Ghana mobile phone operators drive telecoms boom*. Retrieved from www.theafricareport.com.

Data, D. B. (2012). A Practical Guide to Transforming the Business of Government. *TechAmerica Foundation's Federal Big Data Commission*.

D'Aveni, R. (1994). Hypercompetition: Managing the dynamics of strategic maneuvering.

Davenport, T. H. (2006). Competing on analytics. *Harvard business review*, *84*(1), 98.

Davenport, T. H. (2010). The new world of business analytics. *International Institute for Analytics online. Recuperado de https://scholar. google. com. mx/scholar*.

Davenport, T. H. (2012). The human side of Big Data and high-performance analytics. *International Institute for Analytics*, 1-13.

Davenport, T. H., & Harris, J. G. (2007). *Competing on analytics: The new science of winning*. Harvard Business Press.

Davenport, T. H., & Kudyba, S. (2016). Designing and developing analytics-based data products. *MIT Sloan Management Review*, *58*(1), 83.

Davenport, T. H., Barth, P., & Bean, R. (2012). How big data is different. *MIT Sloan Management Review*.

Davenport, T. (2014). *Big Data at Work: Dispelling the myths*, Uncovering the Opportunities. Harvard Business Review Press.

Davenport, T.H., Harris, J.G., & Morison, R. (2010). *Analytics at Work: Smarter Decisions, Better Results*. Harvard Business Press.

Davis, C.K. (2014). Beyond data and analysis. *Commun. ACM 57* (6), 39–41. http://dx.doi.org/10.1145/2602326.

Denzin, N. K., & Lincoln, Y. S. (Eds.). (2011). *The Sage handbook of qualitative research*. Sage.

Dey, M.M., Rabbani, A.G., Singh, K., & Engle, C.R. (2014). Determinants of retail price and sales volume of catfish products in the United States: an application of retail scanner data. *Aquac. Econ. Manag. 18* (2), 120–148. http://dx.doi.org/10.1080/13657305. 2014.903312.

Dilla, W., Janvrin, D.J., Raschke, R. (2010). Interactive data visualization: new directions for accounting information systems research. *J. Inf. Syst. 24* (2), 1–37

Drozdenko, R. G., & Drake, P. D. (2002). *Optimal database marketing: Strategy, development, and data mining*. Sage.

Duncan, C.S. (1919). *Commercial Research*, New York: McMillan Co.

Einav, L., & Levin, J. (2014). The data revolution and economic analysis. *Innov. Policy Econ. 14* (1), 1–24. http://dx.doi.org/10.1086/674019.

Erevelles, S., Fukawa, N., & Swayne, L. (2016). Big Data consumer analytics and the transformation of marketing. *Journal of Business Research, 69*(2), 897-904.

Etherington, D. (2014). Apple sends out iPhone survey, seeks feedback on Android, touch ID and more. http://techcrunch.com/.

Fan, J., & Lv, J. (2008). Sure independence screening for ultrahigh dimensional feature space. *Journal of the Royal Statistical Society: Series B (Statistical Methodology), 70*(5), 849–911.

Fan, J., Han, F., & Liu, H. (2014). Challenges of big data analysis. *National Science Review, 1*(2), 293–314.

Fayyad, U., Piatetsky-Shapiro, G., & Smyth, P. (1996). From data mining to knowledge discovery in databases. *AI magazine, 17*(3), 37.

Ferber, R. (1949). Statistical Techniques in Market Research. New York: McGraw-Hill.

Ferguson, R. (2012). Learning analytics: drivers, developments and challenges. *International Journal of Technology Enhanced Learning*, *4*(5/6), 304-317.

Fisher, D., DeLine, R., Czerwinski, M., & Drucker, S. (2012). Interactions with big data analytics. *interactions*, *19*(3), 50-59.

Forbes,, L. P., & Vespoli,, E. (February 2013). Does Social Media Influence Consumer Buying Behavior?An Investigation Of Recommendations And Purchases. *Journal of Business & Economics Research*, *11*(2), 107-113.

Friedrich, O., Stoler, P., Moritz, M., & Nash, J. M. (1983). Machine of the year: The computer moves in. *Time*, *121*(1), 14+.

Furht, B., & Villanustre, F. (2016). *Big data technologies and applications* (pp. 978-3). Springer International Publishing.

Gandomi, A., & Haider, M. (2015). Beyond the hype: Big data concepts, methods, and analytics. *International Journal of Information Management*, *35*(2), 137-144.

Gartner IT Glossary (n.d.). Retrieved from http://www.gartner.com/it-glossary/bigdata/

Gartner, I. T. (2014). Glossary. (2017). *Big Data*.

Gartner. (2016). IT glossary. Retrieved from http://www.gartner.com/it-glossary/big-data/.

Gayo-Avello, D., (2012). Nov, Nov. No, you cannot predict elections with twitter. IEEE Internet Comput. 16 (6), 91–94. http://dx.doi.org/10.1109/MIC.2012.137.

Gayo-Avello, D., 2013. A meta-analysis of state-of-the-art electoral prediction from Twitter data. Soc. Sci. Comput. Rev. 31 (6), 649–679. http://dx.doi.org/10.1177/. 0894439313493979

Gephart, R. P. (1999). Paradigms and Research Methods, Reaserch Methods Division Forum.

Germann, F., Lilien, G. L., & Rangaswamy, A. (2013). Performance implications of deploying marketing analytics. *International Journal of Research in Marketing*, *30*(2), 114-128.

Ghoshal, A., Larson, E.C., Subramanyam, R., & Shaw, M.J., (2014). The impact of business analytics strategy on social, mobile, and cloud computing adoption. In: Proceedings of the Thirty Fifth International International Conference on Information Systems, Auckland, New Zealand, December 14–17.

Gök, A., Waterworth, A., & Shapira, P., (2015). Use of web mining in studying innovation. Scientometrics 102 (1), 653–671. http://dx.doi.org/10.1007/s11192-014-1434-0

Goldhaber, T. S., Langdon, P. M., & Clarkson, P. J. (2012). Intrinsic motivation and design of ICT for the ageing population. In Designing Inclusive Systems (pp. 105-114). Springer, London.

Grigsby, M. (2015*). Marketing analytics: A practical guide to real marketing science*. Kogan Page Publishers.

Guadagni, P., M. & Little J., D., (1983), "A Logit Model of Brand Choice Calibrated on Scanner Data," *Marketing Science, 2* (3), 203–38

Hand, C., & Judge, G. (2012). Searching for the picture: forecasting UK cinema admissions using Google Trends data. *Appl. Econ. Lett. 19* (11), 1051–1055. http://dx.doi.org/10.1080/13504851.2011.613744.

Hashem, I. A. T., Yaqoob, I., Anuar, N. B., Mokhtar, S., Gani, A., & Khan, S. U. (2015). The rise of "big data" on cloud computing: Review and open research issues. *Information systems, 47,* 98-115.

Hauser, W. J. (2007). Marketing analytics: the evolution of marketing research in the twenty-first century. *Direct marketing: an international journal*, *1*(1), 38-54.

Havens, T. C., Bezdek, J. C., Leckie, C., Hall, L. O., & Palaniswami, M. (2012). Fuzzy c-means algorithms for very large data. *IEEE Transactions on Fuzzy Systems*, *20*(6), 1130-1146.

Hazen, B. T., Boone, C. A., Ezell, J. D., & Jones-Farmer, L. A. (2014). Data quality for data science, predictive analytics, and big data in supply chain management: An introduction to the problem and suggestions for research and applications. International Journal of Production Economics, 154, 72-80.

Helfat, C. E., & Peteraf, M. A. (2003). The dynamic resource-based view: Capability lifecycles. *Strategic Management Journal*, *24*(10), 997–1010.

Hinson, R. E. (2005). Internet adoption among Ghana's SME non-traditional exporters: expectations, realities and barriers to use. *Africa insight, 35*(1), 20-27.

Hinson, R., & Amidu, M. (2006). Internet adoption amongst final year students in Ghana's oldest business school. *Library review, 55*(5), 314-323.

Hitachi Consulting Group. (2005). *Customer and channel analytics.*

Holsapple, C., Lee-Post, A., Pakath, R., (2014). A unified foundation for business analytics. Decis. Support. Syst. 64, 130–141.

http://www.gipcghana.com/about-gc-100.html (accessed on 25th October, 2015 at 17:25 GMT)

https://africanfinancials.com/company/gh-mtn/).

https://datafloq.com (accessed on 22nd October, 2015 at 14:17 GMT)

https://technovagh.com/2017/10/04/evolution-jumia-ghana/

https://techpoint.africa/2018/03/01/ringier-africa-digital-publishing

https://www.bbc.com/news/technology-47553656

https://www.biztechafrica.com

https://www.ghanaweb.com/GhanaHomePage/business/What-is-AirtelTigo-up-to

https://www.ibm.com/software/data/bigdata/what-is-big-data.html (accessed on 22nd October, 2015 at 13:02 GMT)

https://www.internetworldstats.com/

https://www.modernghana.com/news/684692/jumia-ghana-to-boost-economy-with-e-commerce.html

https://www.ringier.com/en/press-releases/corporate/digital/ringier-africa-digital-publishing-radp-expands-rapidly-2017

IBM (2012). What is big data? IBM Corporate Website (Retrieved May 24, 2012 from http://www-01.ibm.com/software/data/bigdata/).

IBM, 2012. The Four V's of Big Data. Available at: http://www.Ibmbigdatahub.com/infographic/four-Vs-Big-Data.

IBM, 2013. Descriptive, predictive, prescriptive: transforming asset and facilities management with analytics. In: Thought Leadership White Paper, (October 2013).

IBM. 2012. “Bringing big data to the enterprise.” Accessed 6 January 2018. http://www-01.ibm.com/software/data/bigdata/

IDC (2014). The digital universe of opportunities: Rich data & the increasing value of the internet of things. EMC2 (Retrieved January 1, 2019 from http://www.emc.com/collateral/ analyst-reports/idc-digital-universe-2014.pdf).

Ige. 0 (1995). Information Technology in a Deregulated Telecommunications Environment, Keynote address. INFOTECH 95. First International Conference on Information Technology Management, Lagos. November 16-17.

Insight, I. (2012). Big just got bigger. Grail Research.

Jacobs, A. (2009). The pathologies of big data. *Communications of the ACM, 52*(8), 36-44.

Jagadish, H. V., Gehrke, J., Labrinidis, A., Papakonstantinou, Y., Patel, J. M., Ramakrishnan, R., & Shahabi, C. (2014). Big data and its technical challenges. *Communications of the ACM, 57*(7), 86-94.

Järvinen, J., & Karjaluoto, H. (2015). The use of Web analytics for digital marketing performance measurement. *Industrial Marketing Management*.

Jayaram, D., Manrai, A. K., & Manrai, L. A. (2015). Effective use of marketing technology in Eastern Europe: Web analytics, social media, customer analytics, digital campaigns and mobile applications. *Journal of Economics, Finance and Administrative Science, 20*(39), 118-132.

Johnson, J. E. (2012). Big data+ big analytics= big opportunity: big data is dominating the strategy discussion for many financial executives. As these market dynamics continue to evolve, expectations will continue to shift about what should be disclosed, when and to whom. *Financial Executive*, *28*(6), 50-54.

Jones, D. B., & Tadajewski, M. (2010). A history of historical research in marketing. *Marketing Theory–A Student Text*, 52-82.

Kaisler, S., Armour, F., Espinosa, J. A., & Money, W. (2013, January). Big data: Issues and challenges moving forward. In 2013 46th Hawaii International Conference on System Sciences (pp. 995-1004). IEEE.

Kannan, P. K., Kline Pope, B., & Jain, S. (2009). Pricing digital content product lines: A model and application for the National Academies Press. *Marketing Science, 28*(4), 620–638.

Kannan, P. K., Pope, B. K., & Jain, S. (2009). Practice prize winner—Pricing digital content product lines: A model and application for the National Academies Press. *Marketing Science*, *28*(4), 620-636.

Kaur, V., & Mehta, V. (2016a). Knowledge-based dynamic capabilities: A new perspective for achieving global competitiveness in IT sector. *Pacific Business Review International, 1*(3), 96–106.

Kikuchi, J. F. (2003). Nursing knowledge and the problem of worldviews. *Research and theory for nursing practice*, *17*(1), 7.

Kiron, D., Prentice, P. K., & Ferguson, R. B. (2012). Innovating with analytics. *MIT Sloan Management Review*, *54*(1), 47.

Kiron, D., Shockley, R., Kruschwitz, N., Finch, G., & Haydock, M. (2012). Analytics: The widening divide. *MIT Sloan Management Review*, *53*(2), 1.

Krishnan, N.C., Cook, D.J., 2014. Activity recognition on streaming sensor data. Pervasive Mob. Comput. 10, 138–154. http://dx.doi.org/10.1016/j.pmcj.2012.07.003.

Kwon, O., Lee, N., & Shin, B. (2014). Data quality management, data usage experience and acquisition intention of big data analytics. *International journal of information management*, *34*(3), 387-394.

Laney, D. (2001). 3D data management: Controlling data volume, velocity and variety. *META group research note*, *6*(70), 1.

Laney, D. (2001). 3D Data Management: Controlling Data Volume, Velocity, and Variety. Application Delivery Strategies. pp. 949. http://blogs.gartner.com/doug-laney/files/ 2012/01/ad949-3D-Data-Management-Contro.

Lansley, G., & Longley, P. (2016). Deriving age and gender from forenames for consumer analytics. *Journal of Retailing and Consumer Services*, *30*, 271-278.

LaValle, S., Hopkins, M. S., Lesser, E., Shockley, R., & Kruschwitz, N. (2010). Analytics: The new path to value. *MIT Sloan Management Review*, *52*(1), 1-25.

LaValle, S., Hopkins, M., Lesser, E., Shockley, R., & Kruschwitz, N. (2010). Analytics: The new path to value: How the smartest organizations are embedding analytics to transform insights into action. *IBM Institute for Business Value in collaboration with MIT Sloan Management review*.

LaValle, S., Hopkins, M., Lesser, E., Shockley, R., & Kruschwitz, N. (2010). Analytics: The new path to value. *IBM Institute for Business Value." October*.

LaValle, S., Lesser, E., Shockley, R., Hopkins, M. S., & Kruschwitz, N. (2011). Big data, analytics and the path from insights to value. *MIT sloan management review*, *52*(2), 21.

Lee, I. (2017). Big data: Dimensions, evolution, impacts, and challenges. *Business Horizons*, *60*(3), 293-303.

Levitt, T. (1992) The Globalization of Markets, in: "Transnational Management: Text, Cases and Readings in Cross-Border Management". Richard D. Irwin.

Li, D. Y., & Liu, J. (2014). Dynamic capabilities, environmental dynamism, and competitive advantage: Evidence from China. *Journal of Business Research*, *67*(1), 2793–2799.

Lilien, G. L. (2011). Bridging the academic-practitioner divide in marketing decision models. *Journal of Marketing*, *75*(4), 196-210.

Ling-Yee, L. (2011). Marketing metrics' usage: Its predictors and implications for customer relationship management. *Industrial Marketing Management*, *40*(1), 139-148.

Liu, Y., Huang, X., An, A., & Yu, X. (2007). ARSA: sentiment-aware model for predicting sales performance using blogs. In: Proceedings of the 30th Annual International ACM SIGIR Conference on Research and Development in Information Retrieval. ACM, pp. 607–614.

Lodish, L. M., Curtis, E., Ness, M., & Simpson, M. K. (1988). Sales force sizing and deployment using a decision calculus model at Syntex Laboratories. Interfaces, 18(1), 5-20.

Lycett, M. (2013). 'Datafication': making sense of (big) data in a complex world.

Lyman, P., & Varian, H. R. (2000). Reprint: How Much Information?. *Journal of Electronic Publishing*, *6*(2).

Malaka, I., & Brown, I. (2015, September). Challenges to the organisational adoption of big data analytics: a case study in the South African telecommunications industry. In Proceedings of the 2015 annual research conference on South African institute of computer scientists and information technologists (p. 27). ACM.

Manyika, J., Chui, M., Brown, B., Bughin, J., Dobbs, R., Roxburgh, C., & Byers, A. H. (2011). Big data: The next frontier for innovation, competition, and productivity.

Marchewka, J. T., & Kostiwa, K. (2007). An application of the UTAUT model for understanding student perceptions using course management software. *Communications of the IIMA*, *7*(2), 10.

McAfee, A., Brynjolfsson, E., Davenport, T. H., Patil, D. J., & Barton, D. (2012). Big data: the management revolution. *Harvard business review*, *90*(10), 60-68.

McCarthy, C., & Bali, S. (2013). Big data analytics and the Telco: How Telcos can monetize customer data. Research No. TE010-000312). Europe: Ovum. Doi, 20.

Melville, N., Kraemer, K., & Gurbaxani, V. (2004). Information technology and organizational performance: An integrative model of IT business value. *MIS quarterly*, *28*(2), 283-322.

Mintz, O., & Currim, I. S. (2013). What drives managerial use of marketing and financial metrics and does metric use affect performance of marketing-mix activities? *Journal of Marketing*, *77*(2), 17-40.

Mintz, O., & Currim, I. S. (2013). What drives managerial use of marketing and financial metrics and does metric use affect performance of marketing-mix activities? *Journal of Marketing, 77*(2), 17-40.

Mithas, S., Lee, M. R., Earley, S., Murugesan, S., & Djavanshir, R. (2013). Leveraging big data and business analytics [Guest editors' introduction]. *IT professional*, *15*(6), 18-20.

Montoliu, R., Blom, J., & Gatica-Perez, D. (2013). Discovering places of interest in everyday life from smartphone data. Multimedia Tools Appl. 62, 179–207. http://dx.doi.org/10.1007/s11042-011-0982-z

Morabito, V. (2015). Big data and analytics. *Strategic and organisational impacts*.

Morgan, N. A. (2012). Marketing and business performance. *Journal of the Academy of Marketing Science*, *40*(1), 102-119.

Moro, S., Cortez, P., & Rita, P. (2015). Business intelligence in banking: a literature analysis from 2002 to 2013 using text mining and latent Dirichlet allocation. *Expert Syst. Appl. 42*, 1314–1324. http://dx.doi.org/10.1016/j.eswa.2014.09.024.

Morosan, C., T. Bowen, J., & Atwood, M. (2014). The evolution of marketing research. *International Journal of Contemporary Hospitality Management*, *26*(5), 706-726.

Mujawar, S., & Joshi, A. (2015). Data analytics types, tools and their comparison. *International Journal of Advanced Research in Computer and Communication Engineering*, *4*(2).

Murthy, I. (2006). Business Analytics in India–Opportunities and Challenges: Discussion. *IIMB Management Review*, 175-191.

Nakatani, K., & Chuang, T. T. (2011). A web analytics tool selection method: an analytical hierarchy process approach. *Internet Research*, *21*(2), 171-186.

Natter, M., Mild, A., Wagner, U., & Taudes, A. (2008). Practice Prize Report—Planning New Tariffs at tele. ring: The Application and Impact of an Integrated Segmentation, Targeting, and Positioning Tool. *Marketing Science*, *27*(4), 600-609.

Neslin, Scott A. (2014). "Customer Relationship Management," *The History of Marketing Science*, Russell S. Winer and Scott A. Neslin (Eds.), Hackensack, NJ: World Scientific Publishing Col, Pte. Ltd, 289-318.

New York: The Free Press.Sharma, R., Mithas, S., & Kankanhalli, A. (2014). Transforming decision-making processes: a research agenda for understanding the impact of business analytics on organisations.

Nicol, C. (Ed.). (2003). *ICT policy: A beginner's handbook*. Association of Progressive Communications.

O'Sullivan, D., & Abela, A. V. (2007). Marketing performance measurement ability and firm performance. *Journal of Marketing*, *71*(2), 79-93.

Oussous, A., Benjelloun, F. Z., Lahcen, A. A., & Belfkih, S. (2018). Big Data technologies: A survey. *Journal of King Saud University-Computer and Information Sciences*, *30*(4), 431-448.

Pandya, S. S., & Venkatesan, R. (2016). French roast: consumer response to international conflict—evidence from supermarket scanner data. *Review of Economics and Statistics*, *98*(1), 42-56.

Patton, M. Q. (2002). Qualitative interviewing. *Qualitative research and evaluation methods*, *3*, 344-347.

Peters, T. J., Waterman, R. H., & Jones, I. (1982). In search of excellence: Lessons from America's best-run companies.

Philpott, S., & CoE, T. B. (2010). Advanced Analytics.

Porter, M. E. (1996). *What is strategy*. Published November.

Porter, M. E., & Millar, V. E. (1985). How information gives you competitive advantage.

Quarshie, H. O., & Ami-Narh, J. (2012). The growth and usage of Internet in Ghana. *Journal of Emerging trends in computing and information sciences*, *3*(9), 1302-1308.

Raguseo, E. (2018). Big data technologies: An empirical investigation on their adoption, benefits and risks for companies. *International Journal of Information Management*, *38(*1), 187-195.

Reed, R., & DeFillippi, R. J. (1990). Causal ambiguity, barriers to imitation, and sustainable competitive advantage. *Academy of management review*, *15*(1), 88-102.

Russo, J. E., Schoemaker, P. J., & Russo, E. J. (1989). *Decision traps: Ten barriers to brilliant decision-making and how to overcome them*. New York, NY: Doubleday/Currency.

Russom, P. (2011). Big data analytics. TDWI best practices report, *fourth quarter*, *19*(4), 1-34.

Rust, R. T., Ambler, T., Carpenter, G. S., Kumar, V., & Srivastava, R. K. (2004). Measuring marketing productivity: Current knowledge and future directions. *Journal of marketing*, *68*(4), 76-89.

SAS. (2013). Five big data challenges. Retrieved from https:// www.sas.com/resources/asset/five-big-data-challenges- article.pdf

Schoen, H., Gayo-Avello, D., Takis Metaxas, P., Mustafaraj, E., Strohmaier, M., & Gloor, P. (2013). The power of prediction with social media. *Internet Research*, *23(*5), 528-543.

Schroeck, M., Shockley, R., Smart, J., Romero-Morales, D., & Tufano, P. (2012). Analytics: The real-world use of big data. *IBM Global Business Services*, *12*, 1-20.

Seth, J. N., & Sisodia, R. S. (2001). High performance marketing: Marketing must be a leader for change across the corporation. *Marketing Management*, *10*(3), 18-23.

Sharda, R., Delen, D., & Turban, E. (2015). Business Intelligence: A Managerial Perspective on Analytics: A Managerial Perspective on Analytics.

Sharma, R., Mithas, S., Kankanhalli, A. (2014). Transforming decision-making processes: a research agenda for understanding the impact of business analytics on organisations. *Eur. J. Inf. Syst. 23* (4), 433–441.

Silk, A. J., & Urban, G. L. (1978). Pre-test-market evaluation of new packaged goods: A model and measurement methodology. *Journal of marketing Research*, *15*(2), 171-191.

Silva-Risso, J. M., Bucklin, R. E., & Morrison, D. G. (1999). A decision support system for planning manufacturers' sales promotion calendars. *Marketing Science*, *18*(3), 274-300.

Sinha, P., & Zoltners, A. A. (2001). Sales-force decision models: Insights from 25 years of implementation. *Interfaces*, *31*(3_supplement), S8-S44.

Srinivasan, S., & Hanssens, D. M. (2009). Marketing and firm value: Metrics, methods, findings, and future directions. *Journal of Marketing research*, *46*(3), 293-312.

Starch, Daniel (1923), *Principles of Advertising*. Chicago: A.W. Shaw Company

Stewart, D. W. (2009). Marketing accountability: Linking marketing actions to financial results. *Journal of business research*, *62*(6), 636-643.

Stonborough, T. H.W. (1942), "Fixed Panels in Consumer Research," *Journal of Marketing*, *7* (2), 129-138.

Suhara, Y., Xu, Y., Pentland, A., 2017. Deepmood: forecasting depressed mood based on self-reported histories via recurrent neural networks. In: Proceedings of the 26th International Conference on World Wide Web - WWW '17. ACM Press, pp. 715–724.

TechAmerica Foundation's Federal Big Data Commission. (2012). Demystifying big data: A practical guide to transforming the business of Government. Retrieved from http://www.techamerica.org/Docs/fileManager.cfm?f=techamericabigdatareport-final.pdf

Teece, D. J. (2007). Explicating dynamic capabilities: The nature and microfoundations of (sustainable) enterprise performance. *Strategic Management Journal*, *28*(13), 1319–1350.

Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. Strategic Management Journal, 18(7), 509–533.

Teng, S., Wei Khong, K., Wei Goh, W., & Yee Loong Chong, A. (2014). Examining the antecedents of persuasive eWOM messages in social media. *Online Information Review*, *38*(6), 746-768.

Torkzadeh, G. & Doll, W. J., 1999. "The development of a tool for measuring the perceived impact of information technology on work," *Omega, Elsevier, 27*(3), 327-339, June.

Tyagi, S., 2003. Using data analytics for greater profits. *J. Bus. Strategy 24* (3), 12–14. http://dx.doi.org/10.1108/02756660310734938.

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS quarterly*, 425-478.

Venter, P., & Tustin, D. (2009). The availability and use of competitive and business intelligence in South African business organisations. *Southern African Business Review*, *13*(2).

Vorhies, D. W., & Morgan, N. A. (2005). Benchmarking marketing capabilities for sustainable competitive advantage. *Journal of marketing*, *69*(1), 80-94.

Vorhies, D. W., Orr, L. M., & Bush, V. D. (2011). Improving customer-focused marketing capabilities and firm financial performance via marketing exploration and exploitation. *Journal of the Academy of Marketing Science*, *39*(5), 736-756.

Vosen, S., Schmidt, T. (2011). Forecasting private consumption: survey-based indicators vs. Google Trends. *J. Forecast. 30* (6), 565–578. http://dx.doi.org/10.1002/for.1213

Waal-Montgomery, M. D. (2015). World's data volume to grow 40% per year & 50 times by 2020: Aureus. Retrieved Syyskuu, 28, 2016.

Wamba, S. F., Akter, S., Edwards, A., Chopin, G., & Gnanzou, D. (2015). How 'big data'can make big impact: Findings from a systematic review and a longitudinal case study. *International Journal of Production Economics*, *165*, 234-246.

Wang, Y., Kung, L., & Byrd, T. A. (2018). Big data analytics: Understanding its capabilities and potential benefits for healthcare organizations. *Technological Forecasting and Social Change*, *126*, 3-13.

Wang, Y., Kung, L., Byrd, T.A., (2016a). Big data analytics: understanding its capabilities and potential benefits for healthcare organizations. Technol. Forecast. Soc. Chang. Online, 1–11. http://dx.doi.org/10.1016/j.techfore.2015.12.019.

Webster, J., & Watson, R. T. (2002). Analyzing the past to prepare for the future: Writing a literature review. *MIS quarterly*, xiii-xxiii.

Wedel, M., & Kannan, P. K. (2016). Marketing analytics for data-rich environments. *Journal of Marketing*, *80*(6), 97-121.

Wedel, M., & Kannan, P. K. (2016). Marketing analytics for data-rich environments. *Journal of Marketing*, *80*(6), 97-121.

White, P. (1931). Market Research Technique. New York: Harper & Brothers

White, Percival (1931). *Market Research Technique*. New York: Harper & Brothers.

White, T. (2012). Hadoop: The definitive guide." O'Reilly Media, Inc.".

Wiersema, F. (2013). The B2B Agenda: The current state of B2B marketing and a look ahead. *Industrial Marketing Management*, *4*(42), 470-488.

Winer, R. S., & Neslin, S. A. (Eds.). (2014). The history of marketing science. New York, NY: World Scientific.

Winter, S. (2003). Understanding dynamic capabilities. *Strategic Management Journal*, *24*(10), 991–995.

Wixom, B. H., Yen, B., & Relich, M. (2013). Maximizing Value from Business Analytics. *MIS Quarterly Executive*, *12*(2).

Wixom, B. H., Yen, B., & Relich, M. (2013). Maximizing Value from Business Analytics. *MIS Quarterly Executive*, *12*(2).

Woldie, A., Hinson, R., Iddrisu, H., & Boateng, R. (2008). Internet banking: an initial look at Ghanaian bank consumer perceptions.

www.britannica.com

www.mtn.com.

Xiong, T., Wang, S., Mayers, A., & Monga, E. (2013). Personal bankruptcy prediction by mining credit card data. *Expert Syst. Appl. 40*, 665–676. http://dx.doi.org/10.1016/ .eswa.2012.07.072

Xu, Z., Frankwick, G. L., & Ramirez, E. (2016). Effects of big data analytics and traditional marketing analytics on new product success: A knowledge fusion perspective. *Journal of Business Research*, *69*(5), 1562-1566.

Yin, R. K. (1981). The case study crisis: Some answers. *Administrative science quarterly*, 58-65.

Zikopoulos, P., & Eaton, C. (2011). Understanding big data: Analytics for enterprise class hadoop and streaming data. McGraw-Hill Osborne Media.

Zoltners, A. A., Sinha, P., & Zoltners, G. A. (2001). *The complete guide to accelerating sales force performance*. AMACOM/American Management Association.

APPENDIX: INTERVIEW GUIDE

UNIVERSITY OF GHANA BUSINESS SCHOOL

DEPARTMENT OF MARKETING AND ENTREPRENEURSHIP

Dear Respondent,

This interview guide is designed to assist the researcher to investigate — "understanding the nature of marketing analytics in Ghana: A case study of multinational firms"

Name
Number of years in Ghana
Number of years in Organisation

A.1. Section 1: purpose of marketing analytic usage

1. What marketing analytic software's are currently used by your organization?

2. When did your organization decided to embark on the marketing analytic? And why?
Time:
Reason:
Key person to initiate:

3. Currently for what purpose does your organization use marketing analytic?

A.2. Section 2: marketing analytic usage and organizational performance

4. What are the various areas of the organizational performance that can be improved by marketing analytic usage?

5. In particular, have your organization seen any direct impact of marketing analytic usage on your organizational performance? If yes in which area?